

THE INSECTS OF VIRGINIA

NUMBER 15



Assassin Bugs of Virginia

(Heteroptera: Reduviidae)

Richard L. Hoffman

Curator of Recent Invertebrates
Virginia Museum of Natural History
Martinsville, Virginia 24112

September 2006



Virginia Museum of
NATURAL HISTORY

IN ASSOCIATION WITH THE SMITHSONIAN INSTITUTION

© 2006 Virginia Museum of Natural History, Martinsville, Virginia 24112.
Printed and bound in the United States of America

ISSN 0098-1222

Layout and production by Lisa Perrell.

All rights reserved. No part of this work covered by the copyrights herein may be reproduced or used in any form or by any means—graphic, electronic, or mechanical—without the prior permission of the publisher: Any request for photocopying, recording, taping, or reproducing in information storage and retrieval of any part of this book should be directed in writing to the Publications Department, Virginia Museum of Natural History, 21 Starling Avenue, Martinsville, VA 24112

 This book is printed on recycled paper.

Note regarding cover illustration: The tiger swallowtail butterfly, *Papilio glaucus* Linnaeus, was selected as a symbol for this series because it was the first insect to be described from North America, and the first specimen to originate from Virginia. The tiger swallowtail was designated by the Virginia General Assembly in 1991 as the state insect of Virginia.

CONTENTS

Acknowledgements	v
Introduction.....	1
Generalities	1
Relative diversity of Virginia reduviids.....	2
Distribution in Virginia.....	2
Biology	3
Systematics.....	4
Identification	4
Key to subfamilies occurring in Virginia	6
Subfamily Saicinae.....	6
Key to Virginia species of Saicinae.....	6
Oncotrachelus acuminatus (Say)	7
Saica elkinsi Blinn	8
Subfamily Emesinae	8
Key to Virginia genera of Emesinae	9
Barce fraterna (Say)	10
[Barce neglecta (McAtee & Malloch)].....	11
Barce uhleri Banks.....	11
Barce wernerii Wygodzinsky.....	11
Emesaya brevipennis brevipennis (Say)	12
Empicoris culiciformis (DeGeer)	14
Empicoris orthoneuron McAtee & Malloch.....	14
Empicoris parshleyi (Bergroth).....	15
Empicoris rubromaculatus (Blackburn)	16
Empicoris tuberculatus (Banks)	16
[Empicoris vagabundus (L.)].....	16
Empicoris winnemana McAtee & Malloch.....	16
Ploriaria carolina Herrich-Schaeffer)	17
Ploriaria hirticornis (Banks)	17
Stenolemus lanipes Wygodzinsky	18
Subfamily Stenopodainae	19
Key to Virginia genera of Stenopodainae.....	19
Ctenotrachelus shermani Barber.....	20
Narvesus carolinensis (Stal)	21
Oncocephalus geniculatus Stal	21
Pnirontis brimleyi Blatchley	22
[Pnirontis infirma Stal].....	23
Pnirontis languida Stal	23
Pnirontis modesta Banks	23
Pygolampis pectoralis Stal	24
[Pygolampis sericea Stal]	25
Stenopoda spinosula Giacchi	25
Subfamily Reduviinae	26
Reduvius personatus (Linnaeus)	26
Subfamily Triatominae.....	27
[Triatoma lectularia Stal]	27
Triatoma sanguisuga (LeConte)	27

Subfamily Peiratinae	28
Key to Virginia genera and species of Peiratinae.....	28
<i>Melanolestes picipes</i> (Herrich-Schaeffer)	29
<i>Rasahus hamatus</i> (Fabricius)	30
<i>Sirthena stria carinata</i> (Fabricius)	31
Subfamily Ectrichodiinae	32
<i>Rhiginia cruciata</i> (Say)	32
Subfamily Hammacerinae.....	33
<i>Microtomus purcis</i> (Drury)	33
Subfamily Apiomerinae	34
<i>Apiomerus crassipes</i> (Say)	35
[<i>Apiomerus spissipes</i> (Say)]	36
Subfamily Harpactorinae	36
Key to Virginia genera of Harpactorinae	37
<i>Acholla multispinosa</i> (DeGeer)	37
<i>Arilus cristatus</i> (Linnaeus)	38
<i>Atrachelus cinereus</i> (Fabricius).....	39
[<i>Doldina interjungens</i> Bergroth]	39
<i>Fitchia aptera</i> Stal	40
<i>Fitchia spinosula</i> Stal.....	40
<i>Pselliopus barberi</i> Davis	41
<i>Pselliopus cinctus</i> (Fabricius)	42
<i>Pselliopus latifasciatus</i> Barber	43
[<i>Repipta taurus</i> (Fabricius)]	43
<i>Rocconota annulicornis</i> (Stal)	44
<i>Sinea diadema</i> (Fabricius)	45
<i>Sinea spinipes</i> (Herrich-Schaeffer)	46
<i>Zelus cervicalis</i> Stal	47
[<i>Zelus longipes</i> (Linnaeus)]	47
<i>Zelus luridus</i> Stal	47
<i>Zelus tetracanthus</i> Stal.....	48
Literature Cited	49
Maps	51

ACKNOWLEDGEMENTS

I am indebted to a wide spectrum of friends and colleagues for their contributions to preparation of the following manual. Existing museum collections provided not only numerous Virginia locality records for most of the species treated herein, but also the means for making or confirming identifications of problem specimens. Access to the rich holdings of the National Museum of Natural History was granted over for many years by Drs. Richard C. Froeschner and Reece I. Sailer; more recently Dr. Thomas J. Henry has put this great resource at my disposal. I was able to extract data from other sources through their curators: Dr. L. L. Pechuman, Cornell University; Dr. Richard R. Mills, Virginia Commonwealth University; Dr. Cecil L. Smith, University of Georgia Museum of Natural History; Dr. Lewis L. Deitz and Mr. Robert L. Blinn, North Carolina State University; Mr. Frank Mead, Florida State Collection of Arthropods; and Dr. Michael Kosztarab, Virginia Polytechnic Institute and State University.

Extensive series of Heteroptera, including many species new to the known fauna of Virginia, have come from inventories conducted throughout the state by personnel of the Division of Natural Heritage, Department of Conservation & Recreation, in the Secretariat of Natural Resources, Richmond, Virginia.

The precedent of donating their extensive collections to VMNH, initiated by staff zoologist Christopher A. Pague, has been continued and expanded since 1990 by his successor, Dr. Steven M. Roble. Several species of reduviids are documented in the state fauna solely on the basis of captures made during VDNH inventories. Dr. Roble also, on my behalf, investigated the bug collection at the American Museum of Natural History for records pertinent to several of the less-common species. Many specimens were taken by Dr. Joseph C. Mitchell during the course of his own inventory activities over the past two decades.

Permission to copy and use several illustrations that appeared in the "Catalog of Heteroptera, or True Bugs, of Canada and the Continental United States" (Henry & Froeschner, 1988) was granted by the Department of Entomology, National Museum of Natural History, through the kindness of Dr. Henry.

INTRODUCTION

The following account of the reduviids ("assassin bugs") is the fifth installment of a serial treatment of the Virginia species of the insect order Heteroptera. In the absence of a consensus about their status among students of these insects, I arbitrarily follow historical precedent by exclusion of the phymatids as a separate family in the Reduvidae.

As so restricted, the family Reduviidae is one of the largest in the order, with over 6500 species known worldwide and many yet to be discovered. Most are tropical, and many of those occurring in Virginia are restricted to the eastern, warmer parts of the state. Since all species are predatory, they play an important role in maintaining the population balance of many other kinds of insects, including major crop pests. In the American tropics, some species are of public health importance as vectors for such infirmities as Chagas' Disease, and it has even been postulated that the serious debilitation afflicting Charles Darwin was the result of his having contracted this or a similar disease from a reduviid bite in Argentina. Several Virginia species can inflict very painful bites, but none are implicated in disease transmission.

There is a striking diversity in body form and size within the family, ranging from tiny, delicate emesines (about 5 mm long) to large and robust species such as the familiar "wheel bug" with a length of over 40 mm. As might be expected, existing reference collections tend to be biased in favor of the larger and more common species, as many of the small forms are inconspicuous and some require special collection techniques. The disparity in terms of available study material is strikingly reflected in the maps showing in-state distributional records.

In general, the format of this document closely follows that established in its predecessors, particularly that dealing with the Lygaeidae (Insects of Virginia, fasc. 14, 1996). One noticeable departure concerns the mode of illustration: some species are depicted from oblique anterolateral aspect instead of the traditional dorsal view. This different perspective gives a better impression of several structural features as well as a more personalized appearance to the subject.

The primary source of material consulted continues to be the collection at the Virginia Museum of Natural History (VMNH), Martinsville, which includes the specimens previously housed at Radford University and the University of Richmond. Additional major sources of information are

the collections at the National Museum of Natural History (cited as USNM) and the Department of Entomology, Virginia Polytechnic Institute and State University (VPISU). Additional records have been obtained from collections at Virginia Commonwealth University (VCU) and Cornell University (CUIC), and the status of several species as they occur south of Virginia was checked at North Carolina State University (NCSU), the University of Georgia (UGIC), and the Florida State Collection of Arthropods (FSCA). In all approximately 2000 reduviids from Virginia have been examined.

Species known from more than ten counties and cities are cited merely by those political units; those from less than ten are provided with complete collection data. If no collectors' name is given, it is understood to be me or a collecting group from VMNH.

A development of major importance to the study of our insect fauna has been the utilization of pitfall trapping by staff of both the Virginia Museum of Natural History and the Division of Natural Heritage of the Virginia Department of Conservation and Recreation during the past decade. This technique has been responsible for our only in-state records for several small, rarely-collected ground-dwelling bugs, as well as numerous records for more pervasive species.

Persons interested in the taxonomic study of Reduviidae benefit from several very useful publications that have appeared during the several decades.

(1) *How to Know the True Bugs* (Slater & Baranowski, 1978), which contains keys to most of the reduviid genera occurring in Virginia, with good drawings for many of them,

(2) *Catalog of the Heteroptera, or True Bugs, of Canada and the Continental United States* (Henry & Froeschner, 1988),

(3) *Systematic Catalogue of the Reduviidae of the World* (Maldonado Capriles, 1990).

(4) *True Bugs of the World (Hemiptera: Heteroptera)* (Schuh & Slater, 1995), which provides keys to 22 subfamilies and brief characterizations for each, as well as an overview of reduviid biology.

Two older references, which are still extremely valuable for study of the local reduviid fauna are

(5) *Heteroptera or True Bugs of Eastern North America, with Especial Reference to the Faunas of Indiana and Florida* (Blatchley, 1926), and

(6) "A Monograph of the Emesinae (Reduviidae,

Hemiptera)" (Wygodzinsky, 1966).

As before, the species included for treatment are any known from within 100 miles of the Virginia state line, or which have been recorded from two sides of the state regardless of distance. This latitude has doubtless encompassed some very unlikely candidates, such as those with old and unconfirmed records for "New Jersey" and "Pennsylvania", for which I have seen no material from farther north than the Carolinas or Georgia. These are given the benefit of doubt and entered, unnumbered, in the keys and text, with appropriate explanation. But even this generous scope will probably be shown inadequate, as proven by the case of *Barce weneri* which would have fallen far outside the "100 mile" perimeter. Particularly in the Emesinae, virtually any species known from eastern United States may be found here with appropriate collecting techniques or by serendipity.

Except for addition of the taxon Triatominae, the organization of subfamilies in the text follows that of Blatchley (1926), which seems to fairly represent relationships of the subfamilies, rather than the two recent catalogs which are alphabetically arranged at all levels. However, the order of genera and species within each subfamily is alphabetical since relationships are not especially evident at a local level.

The practice of assigning numbers to the species serves no particular purpose aside from giving an approximate number of how many species have been recorded from Virginia in the families of "Geocorisae" treated in the series to date. There is a slight discrepancy between the last lygaeid (184) and first reduviid (187), owing to the addition of several species of seed bugs since 1996.

As in the case of the lygaeid fascicle, distribution maps are provided for all species, even though for some the poverty of records is simply more of a challenge to collectors than an accurate image of instate occurrence. Map symbols represent an actual diameter of about 3.6 miles (6 km) and are placed as precisely as possible, not simply centered in each county. All of the localities cited in detail may be located on the *Virginia Atlas and Gazetteer* published by the DeLorme Mapping Company, Freeport, Maine, and also on the series of county maps issued by the Virginia Department of Transportation. The great majority will be found also on any standard state highway map. Collection sites too small to appear on the foregoing are referenced by distance and direction from the nearest mapped place. The representations of North American range in the small inset maps are in many cases only approximations, deduced from the general statements given by Blatchley and the states cited in the Henry & Froeschner catalog.

Some refinements have been added from the few published state lists, but in general most of the inset maps are subject to massive improvement with information from local inventory activities.

Relative diversity of Virginia reduviids

Following the precedent of earlier fascicles, I have compiled for comparative purposes the number of reduviids recorded from a number of eastern states. Obviously, many of the figures taken from earlier sources are no longer accurate, owing both to taxonomic changes and recent discoveries. Of course the level of collecting intensity has varied considerably from state to state, but in very general terms the following tabulation suggests the extent of reduviid diversification in the area surveyed (species considered by the authors as likely additions to the faunas treated follow in parentheses):

Texas (Elkins, 1951)	94
Florida (Blatchley, 1926)	56
Virginia (this paper)	46 (10)
North Carolina (Brimley, 1938, Wray, 1967)	45
Missouri (Froeschner, 1944)	34 (7)
Illinois (Hagerty & McPherson, 1991)	30
Oklahoma (Drew & Schaefer, 1963)	29 (4)
Michigan (McPherson, 1992)	28
Indiana (Blatchley, 1926)	27
New York (Leonard, 1926)	23

The remarkable contrast between the totals for Texas and Oklahoma implies that much of the Texan diversity is concentrated toward the southwestern Gulf coast region. The influence of a large Mesamerican mainland faunal source is obviously much greater than that exerted by the West Indies upon southern Florida. Of course, the long residence of J. C. Elkins, a skillful collector, in Texas is surely an important factor as well.

Distribution in Virginia

As with most other kinds of organisms, the distribution of reduviids in Virginia is influenced by elevation and climate. Aside from euryzonal, statewide species, there are others with austral or boreal affinities. As might be expected from a dominantly tropical family, a major part of our reduviid fauna falls into the first category with representation in the eastern, warmer part of the state. At present, 10 species reach their northernmost known limits in Virginia, most of them in the Coastal Plain:

Saica elkinsi
Ploiaria carolina
Barce werneri
Stenolemus lampes
Pnirontis brimleyi
Pnirontis languida
Ctenotrachelus shermani
Oncocephalus geniculatus
Rasahus biguttatus
Zelus cervicalis

Another contingent contains species which extend northward along the coast as far as Long Island or Cape Cod, and are widespread in Virginia east of the Blue Ridge. *Ploiaria hirticornis* is an example.

A variant form of this austral pattern is made up of species of southern affinity which occur in eastern Virginia but also extend northward west of the Appalachians into the central lowlands and as a result are to be found in extreme southwestern Virginia. The upper Tennessee Valley thus represents an interior faunistic extension of the Piedmont.

Narvesus carolinensis
Sirthenia stria carinata
Rocconota annulicornis

The few Nearctic reduviids with boreal affinities are poorly represented in Virginia, with *Acholla multispinosa* and *Barce uhleri* perhaps the best examples. However, *Rhynocoris ventralis* and *Barce neglecta* may well join this category if and when they are eventually found within the state.

Local distribution is still not adequately known, especially for the smaller and rarely collected species, but it is probably safe to estimate that of our 46 recorded species, at least 23 (50%) occur statewide - except perhaps for elevations above 3000 feet ASL.

Which areas have the largest number of species? As expected, places near or adjacent to an agency (governmental or academic) at which research on insects is conducted will be best represented. A few others having some intrinsic faunal significance have attracted substantial interest as well.

City of Richmond	26
City of Virginia Beach	25
City of Suffolk	22
Fairfax County	21
Montgomery County	19
Alleghany County	17

An interesting feature resulting from increased knowledge of local distribution is the impression that some species of reduviids have spread northward in recent decades, as noted in the accounts of *Sirthenia stria*, *Rocconota annulicornis* and *Stenopoda spinulosa*. A similar situation was remarked by me (1996) for the lygaeid bugs *Neopamera albocincta* and *N. bilobata*, and later established for a fulgorid bug, *Calypso proctus marmoratus* (Hoffman, 2005).

Biology

Knowledge of reduviid biology up to that time was summarized by Read in 1927. Blatchley (1926) published details from his extensive personal experience in Florida and Indiana. While the biology and life histories of many common species have been worked out and reported in numerous papers during the past several decades, perhaps the most useful in terms of relevance to the Virginia fauna are those of McPherson and collaborators (1991-99), working with these insects in Illinois, and of Sweadner & Yonke (1973-1975), in Missouri. While specific information is provided under various species account that follow, some generalizations about the biology of the local representatives are offered at this point.

All species of reduviids are carnivores, predatory chiefly upon other small arthropods, although a few have specialized on the blood of various vertebrates, including Man. As a result, a number of adaptations associated with food capture have evolved, particularly with respect to the 1st pair of legs which are often characterized as "raptorial". The development of femoral and tibial spines is the most obvious manifestation, shown impressively in such genera as *Ploiaria*, *Pnirontis*, and *Sinea*. The opposed, outstretched forelegs of *Pnirontis* form a virtual "basket" for prey capture and management similar to what occurs in dragonflies. At the opposite extreme are genera in the Harpactorinae, such as *Zelus* and *Rocconota*, in which the profemora are but scarcely thicker than the mesofemora, and the tibiae thickened not at all. In these forms the anterior podomeres are invested with short setae which secrete a sticky substance, thus functioning as a kind of living flypaper - specimens often have a variety of detritus adhering to their front legs. This modification is taken to an extreme in *Apiomerus*, in which the opposed sides of the protibiae and profemora are densely clothed in short setae, producing a kind of "furry" surface; in this genus the tarsi are reduced in size and retractable into a deep apical groove on the tibiae. *Arilus cristatus*, an insect top-predator, may depend largely upon simply impaling its prey (particularly insect larvae) with the extended rostrum and using the forelegs little if at all.

Clearly these various modifications have evolved in response to specific food capture techniques, although the impression is gained that all such species are more or less opportunistic predators and prey upon whatever they are able to capture. The same comment applies to modifications of the rostrum, which varies greatly in length and in the relative proportions of the three segments. To some extent this reflects the shape of the head: dolichocephaly produces a long 2nd segment as a rule. The most apparent case of prey specialization, the fondness of many emesines for spiders and/or the small insects captured in spider webs, manifests itself in a variety of head and rostrum shapes. Do these reflect subtle, fine-tuned, differences in food capture and management?

Although evidence about specific habitat requirements is lacking for many groups of reduviids, the predilection of emesines for dark, dry habitats is well-known: cellars and outbuildings are often frequented, the more so if spiders occupy the same sites. The bugs negotiate the webs with impunity although there is no obvious specialization of the tarsi for this ability. Most of the specimens of *Barce* that I have collected were found under sticks and stones in dry places; the majority of the VMNH material was taken in pitfall traps set in wooded areas. All of our specimens of *Stenolemus lanipes* were attracted to ordinary household lights; I have never had one come to a UV trap or lighted sheet. *Emesaya brevipennis* is most frequently taken by sweeping, beating, or visual inspection of foliage (especially the canes of blackberries). It is my impression that most stenopodines must be nocturnal hunters, at least they come to lights more often than members of the other subfamilies, and occasional individuals of *Pnirontis* are about the only stenopodines found by sweeping. Wingless females and nymphs of *Oncocephalus geniculatus* are captured in pitfalls more frequently than other members of the subfamily. I am not aware of any Virginia records for any species of reduviid in caves. *Doldina interjungens*, not yet found in Virginia but certainly to be expected here, is partial to subaritime habitats: grasses and sedges near salt marshes, where usually found at Floridian localities.

Apiomerus and some harpactorine genera like *Pselliopus*

and *Sinea* appear partial to passive, ambush hunting on plants with ample inflorescences. Zelinae in general seem to be diurnal hunters, although a few, such as *Rocconota annulicornis*, come to lights with such regularity one may assume they are normally active at night. The same may be true also for *Melanolestes picipes*, which occasionally appears at a UV trap or sheet in large numbers.

Lists of other arthropods taken as food items are extensive and virtually cover the taxonomic spectrum without bias. The only indication that any reduviid feeds exclusively on one food source (beyond the apparent association of many emesines with spider webs and *Triatoma* with mammals) is the dependence of African species of Ectrichodiinae upon diplopods, although this stenophagy has not been demonstrated for our local member of this subfamily. Wheel bugs (*Arilus*) frequent vegetable gardens in late summer and consume large numbers of caterpillars and bean beetles, although the predators themselves are rarely numerous enough to abolish the pests. Cone-nosed bugs (*Triatoma*) occur in mammal nests, and on occasion enter homes. Apparently in earlier times they bit sleeping residents of modest homes in rural areas (and still do, in the tropics), but I have no direct knowledge of such predation in Virginia.

Some species have one generation per season (univoltine), others two (bivoltine); these are itemized in the generic or specific headings. Some overwinter as adults, others as late instar nymphs, a few in both conditions. As a general rule, the period of adult activity in Virginia is more centered on midsummer than is true for lygaeids which frequently peak in late summer or early autumn. Data sorted by month of capture are given for most species, although pitfall material taken in trap runs overlapping two months could not be utilized. The numbers cited beside specific months in tabulating the seasonal abundance of various species indicate the total number of *individuals* (not collections) taken during those months. The objection may be raised that information derived from nonstandardized or noncontrolled sources is only anecdotal, but at least it is consistently random and gives a reasonable image of the idea intended.

SYSTEMATICS

Identification

In order to distinguish large numbers of species, identification keys in major taxon revisions frequently must resort to structural details requiring special knowledge to recognize and use. For the few species present in a small geographic area, it is usually possible to select fairly superficial and easily seen features, even size and color. It should be understood that the keys (and diagnoses) in the following pages are intended to separate only those taxa known to occur in Virginia or considered likely residents. The primary character used to separate the subfamilies Stenopodainae and Harpactorinae in the key to subfamilies is not used in any previous key known to me and presumably is not valid for the world fauna, but is easy to see and totally reliable for the taxa occurring in Virginia.

It is emphasized that key characters are based on the structure of **adult** specimens; nymphs are best identified by association with known adults. For example, ocelli are missing from the immature stages and most nymphs would go astray in the very first couplet of the key to subfamilies. Nymphs are typically more spiny overall than adults, and frequently their profemora are distinctly thicker.

Some changes in anatomical terms are adopted here, following the terminology used by Schuh & Slater (1995). Thus, the anterior median region of the head, previously referred to as the "tylus", is now called the *clypeus*. The modified feeding structure of heteropterans, the "beak" of previous fascicles, becomes the *rostrum*, although the majority of its structure is known to be derived from the labium of generalized mouthparts.

As unsatisfactory and ambiguous as the term may be, I have been unable to devise a suitable substitute for "lobe" as applied to one of the two regions of the prothorax, and reluctantly perpetuate its use.

To avoid the hybridization of classical prefixes on Anglo-Saxon stems (e.g., pro-, meso-, and metalegs) I have adopted the device of "1st, 2nd, and 3rd" to refer to these appendages (as preferable to front, middle, and rear), but retain such combinations as procoxa or metatibia to denominate the podomeres.

Essentially all characters used in keys and diagnoses are visible on pinned or pointed specimens with a magnification of 60×. However, to see venation details in *Empicoris*, particularly, it may be necessary to relax the point of wing attachment with a tiny drop of alcohol (water does not work well) and carefully separate the wings with a dissecting needle, since emesines trapped in alcohol

(malaise or pitfall traps) usually have the wings intertwined and/or distorted. They cannot be separated on dry material without inflicting unacceptable damage.

Length measurements as given are from tip of clypeus to end of abdomen, not apices of wings.

Family REDUVIIDAE

A large group, so structurally diverse as to make unequivocal definition difficult. Head porrect, transversely grooved dorsally at about level of eyes. Eyes large, in males sometimes nearly in contact mid-ventrally. Bucculae not developed. Rostrum with three segments. Prosternum modified between 1st legs into a deep groove, considered to be a stridulitrum (although in most local species the surface texture is so fine that a role in sound production seems implausible). Metathoracic scent glands and evaporatoria rudimentary or absent. Forewings overlapping, no claval commissure formed. In some subfamilies there is no differentiation of the forewings into hemelytra: in some Emesinae they are scarcely more thickened than the rear wings. No cuneus is present. Apical third (or membrane region) with two elongated, sometimes subdivided, cells. Some species contain wingless adults, in others wings may be present in males and absent from females.

The composition of this large and very diverse, primarily tropical family is by no means established with unanimity. The classification adopted by Schuh & Slater (1995: 151) is the more inclusive and embraces phymatids as one of the 22 subfamilies. The catalog by Maldonado (1990) recognizes 27 subfamilies, but excludes phymatids and several other taxa as valid families. As the relative rank assigned to various groups is based on the subjective weighting of various characters alone or in combination, obviously some time may elapse before a consensus is reached. My personal preference is to observe tradition and assign family status to phymatids. Maldonado's system accounted some 912 genera and 6224 species prior to 1990; the Schuh & Slater total is 930 genera and 6500 species for their more inclusive concept of Reduviidae. By now, the numbers in both categories will have increased somewhat, although the most prolific describers of tropical reduviids are no longer active.

Nine subfamilies, 27 genera, and 46 species are represented in the Virginia fauna. Numbers in the last two categories may be expected to increase to as many as 33 and 54, as collecting efforts in the state are intensified.

Key to Subfamilies of Reduviidae in Virginia

1. Ocelli absent from adults; base of forewings not differentiated (thickened) as hemelytra.....2
 - Ocelli present; forewings more or less modified into a coriaceous, opaque, basal region and a membranous distal.....3
2. Front coxae greatly elongated (Fig. 16); coxal sockets (acetabula) of forelegs opening anteriorly on prothorax; legs and antennae very long and slender.....Emesinae, p. 8
 - Front coxa not more than twice as long as broad; coxal sockets of forelegs opening more anterolateral; legs and antennae not hypertrophied.....Saicinae, p. 7
3. Tibiae of 1st legs with an apical eversible pubescent surface (pad)4
 - Tibiae of 1st legs without an eversible apical pad.....8
4. Apex of scutellum bifid or bispinose, antennae with more than four articles.....5
 - Apex of scutellum simple, acuminate, antennae with four articles6
5. Ocelli placed between eyes (Fig. 36); 2nd antennomere filiform, divided into numerous small pseudosegments; head and thorax coarsely tuberculate.....Hammacerinae, p. 33
 - Ocelli placed behind posterior edge of eyes; 3rd and 4th antennomeres each divided into two or three to give a total of about eight; head and thorax smooth and polished.....Ectrichodinae, p. 32
6. Apical pad of protibiae rudimentary, about as long as 1st tarsomere; preocular part of head elongated and bent dorsad (Fig. 30); pro- and mesofemora with a pair of small subapical tubercles on ventral side.....Triatominae, p. 27
 - Apical pad of protibiae large, longer than 2nd tarsomere and conspicuous; preocular part of head not prolonged and bent upward; pro- and mesofemora without pair of subapical tubercles on ventral side7
7. Thorax constricted behind its midlength; outer surface of front coxae convexReduviinae, p. 26
 - Thorax constricted at or anterior to its midlength; outer surface of front coxae flat or concave.....Peiratinae, p. 28
8. Scutellum apically truncate, subtrapezoid in shape; tarsi of 1st and 2nd legs reduced in size and accommodated in deep apical grooves on dorsal side of tibiae; 3rd joint of rostrum minute, as broad basally as long.....Apiomerinae, p. 34
 - Scutellum triangular, apically acute; tarsi of 1st and 2nd legs not reduced and received in tibial grooves; 3rd

joint of rostrum distinctly longer than its basal diameter.....9

9. Protibiae without apical spur on dorsal side. Posterior division of head longer than anterior; basal antennomere usually thickened and/or directed forward; tarsal claws simple; most species with one or more elytral cells pigmentedStenopodainae, p. 19
 - Protibiae with apical spur (Fig. 41). Posterior division of head shorter than anterior; basal antennomeres usually long and slender, not porrect; tarsal claws with large blade-like processes (Fig. 42); elytra either entirely clear or entirely dark, no individual cells pigmentedHarpactorinae, p. 00

Subfamily I. SAICINAE

Relatively small reduviids, length to about 10 mm, front of head short, ocelli absent. 2nd rostrum basally incrassate; thorax strongly constricted near midlength, posterior region larger and broader, deep median groove present. Legs and antennae long, slender, setose. Three tarsomeres; tarsal claws curved, simple, without basal modification.

The close phylogenetic relationship between the subfamilies Saicinae and Emesinae was discussed in detail by Wygodzinsky (1966: 59-62), who postulated that the latter represented a generally more apotypic clade deriving from a common ancestor of the two taxa. Among the Virginia representatives, similarities are expressed notably between species of *Saica* and *Empicoris* in overall body form as well as shape and relative lengths of the rostral segments (cf. Figs. 2 and 3).

Present knowledge about the regional fauna of this small subfamily derives from a synoptic paper by R. L. Blinn (1994) in which *Saica elkinsi* is described.

Key to Virginia genera and species of Saicinae

- Each humeral angle of pronotum and base of scutellum with long, slender, obliquely erect spines; prothorax extended anteriorly in front of coxal sockets and produced into an acute spine on each side; 1st legs long and slender, the femora slightly curved, the tibiae markedly so*Saica elkinsi*, p. 8
- Humeral angles and scutellum without slender erect spines; prothorax not extended in front of coxal sockets and not spined; 1st legs not notably long and slender, neither femora nor tibiae curved, but the latter slightly sinuous*Oncerotrachelus acuminatus*, p. 7

Genus *Oncerothelus* Stål

Basal segment of rostrum about as long as distal two combined, second notably subglobose. Thorax without dorsal spines; scutellum produced distally into long slender, nearly horizontal spine. Dorsal edge of metapleuron produced into a slender acute spine; connexival angle of basal abdominal segments produced into smaller, less obvious spines. Meso- and metasterna with high sharp median carina. Entire body distinctly hairy.

The range of this genus, as defined by its 12 presently known species, is dominantly Neotropical with the majority of its taxa in the West Indies or circumcaribbean region. Two occur southward to Argentina. Of the two native to the United States, one is confined to Texas, the other is very widespread in eastern North America.

So far as known, these bugs live on or close to the ground in a variety of habitats; they frequently are attracted to lights.

187. *Oncerothelus acuminatus* (Say)

Figure 1, Map 1

Length 5-6 mm, females slightly larger than males. Body various shades of yellow to light brown; thorax often darker; scutellum and most of hemelytra fuscous to nearly black, giving impression of a dark middorsal abdominal band trimmed by the abruptly lighter costal vein and stigma. Profemora only slightly incrassate, metatibiae sinuous.

This attractive little yellow and black bug is very widespread in eastern North America, from New England and Minnesota south to Florida and Texas. It appears to be nearly statewide in Virginia, but not yet recorded from higher elevations. Accomack, Alleghany, Bath, Clark, Cumberland, Dinwiddie, Fairfax, Greenville, Halifax, Henry, Isle of Wight, Loudoun, Louisa, Montgomery, Northampton, Patrick, Pittsylvania, Prince William, Rockingham, Sussex, Washington, and York counties, and the cities of Chesapeake, Norfolk, Richmond, Suffolk, and Virginia Beach.

Most of the specimens at hand were taken by pitfall traps or at UV lights in a variety of habitats, providing little information about the preferred microhabitat. Perhaps *acuminatus* is a generalized predator associated with grasses or low forbs or simply the ground surface. Virginia specimens were taken between early April and early November, the greatest numbers in May (15) and June (33). Most of the samples contain one or two specimens only, but during June 1989, pitfalls at the Oceana Naval Air Station and nearby Pendleton Navy Base, in Virginia Beach, captured 10 and 12 individuals respectively.

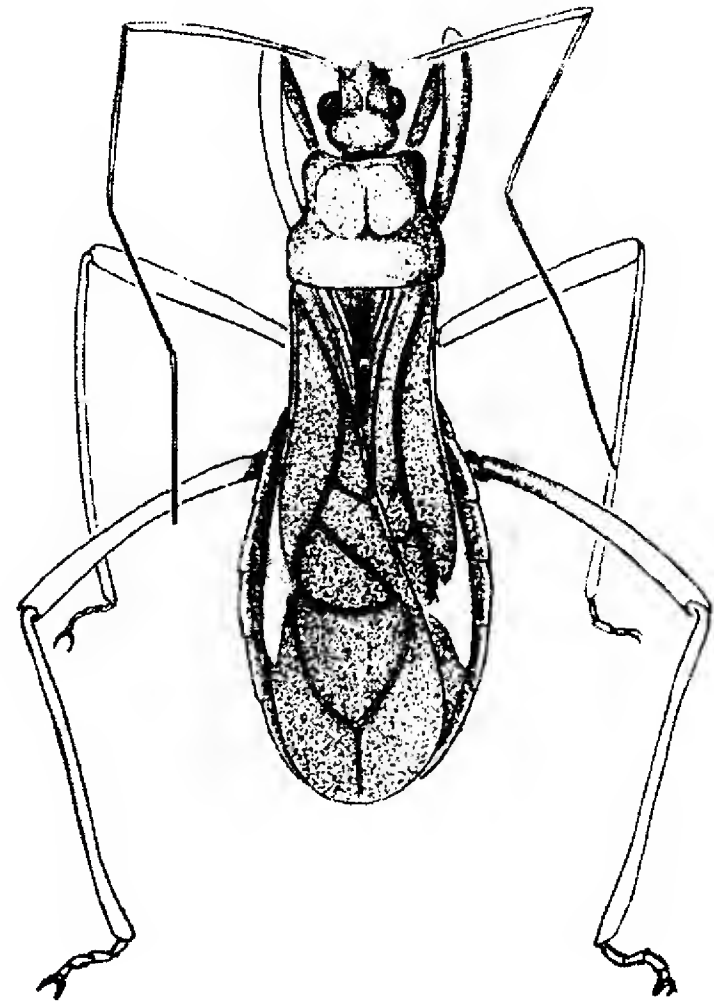


Figure 1. *Oncerothelus acuminatus* (Say)

All of our males are fully winged, and most of the females are apterous. Occasional females, however, do have wings.

Genus *Saica* Amyot & Serville

Thorax with long humeral spines, scutellum with long erect basal spine and apex also turned upward. Legs very long, anterior tibiae distinctly curved, with a marginal fringe of short, stiff brown setae, apex only slightly clavate, without ventrodiscal pubescent pad. Basal tarsomere as long as the abbreviated 2nd and 3rd combined, 3rd with profuse ventral vestiture of long dense setae. Dorsal edge of metapleuron without spiniform projection. Connexival angles not spiniform. Abdomen without midventral carina. Edge of male hypopygium broadly transverse, with two paramedian, laterally directed spiniform projections.

Essentially nothing definite is known about the life style in this genus, inferentially the species may be ground dwellers, perhaps favoring grassy biotopes.

The genus contains 13 nominal species, confined to the New World tropics and southeastern United States.

188. *Saica elkinsi* Blinn

Figure 2, Map 2

Length to about 8.5 mm. Structure as described for the genus, body overall varying shades of yellow, yellowish-brown, or beige, membrane and clavus of hemelytra fuscous to nearly black; legs yellow except for pink distal ends of femora.

This recently described species is widespread but only rarely collected. The range extends from Virginia to Louisiana and Missouri but is not restricted to the Coastal Plain as the type locality is in the central Appalachians at an elevation of 1800 ft (600 m.) ASL. Our known state records are:

Dickenson Co.: Breaks Interstate Park, near Haysi, 1-14 July 2000, Robert Vigneault (at lights) (VMNH 1). **Halifax Co.:** swamp beside Rt. 602, 3.5 mi E of Riceville, 8 August 1998 (UV light) (VMNH 1). **Montgomery Co.:** Radford Arsenal, 10 August 1951 (at light) (USNM 1, the holotype); Blacksburg, 13 August 1974 (USNM 1); 13 July 1952 (USNM 1). **Pittsylvania Co.:** Chatham, 27 July 1963, (UV light), W. Tarpley (USNM 2). **City of Suffolk:** South Quay barrens, ca. 6 miles southeast of Franklin, Area 50, cane swamp, 30 June 2003, S. M. Roble, UV light (VMNH 1).

The majority of the Virginia specimens were collected at lights, both UV and incandescent. Some of these captures were in the immediate vicinity of water, others considerably removed from wet habitats. Blinn surmised that *elkinsi* is a "ground dwelling predator associated with grasses or other herbaceous plants".

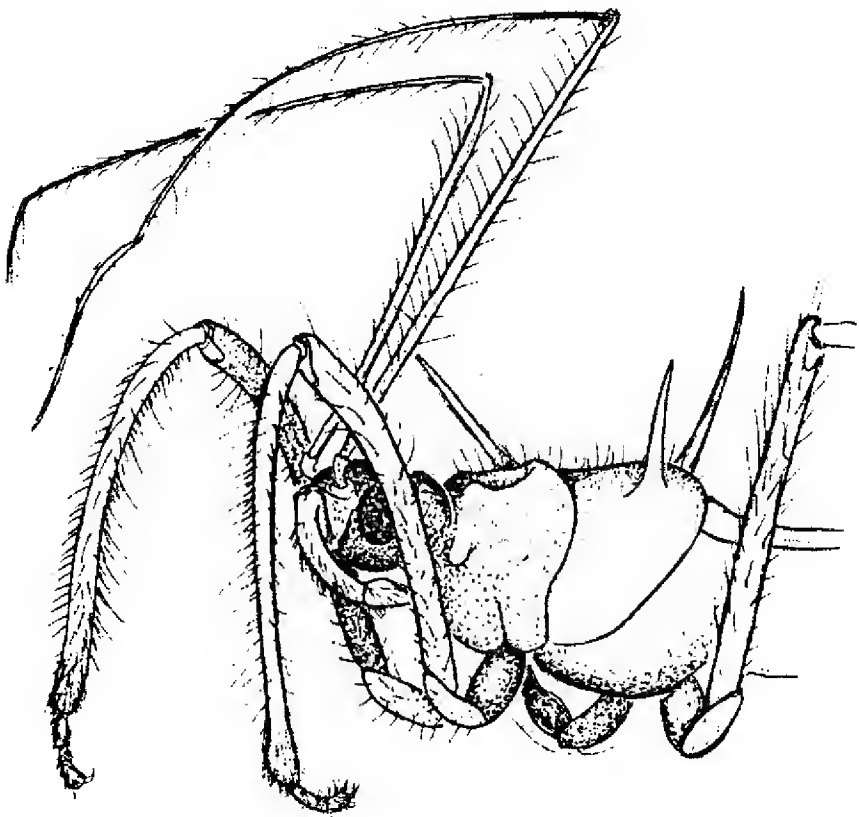


Figure 2. *Saica elkinsi* Blinn.

The original description provided only incomplete pin label data for the type locality and did not specify either the county or state for the Radford Arsenal.

Subfamily II. EMESINAE

Species of this curious group are given the "book name" of "thread-legged bugs", because of their greatly elongated bodies and corresponding long, slender legs and antennae. By some previous authors they were given full familial rank (and understandably so if only the small Nearctic fauna is considered), but the weight of all recent authority now supports subfamily status. The most significant structural apomorphy of the group appears to be the placement of the acetabula of the 1st legs on the *anteroventral* side of the prothorax rather than the lateral or anterolateral, but even this difference seems somewhat arbitrary and mutable.

The impression of superficial similarity in body form of emesines is at once dispelled by a closer inspection, particularly of head and thoracic structures. Shape of the head, placement of its transverse subdivision, proportions of the rostral segments, form of the thorax, and placement of the legs are all subject to extensive variation which magnification shows to be as diverse as to be found in any comparable group of bugs. Our local genera can be distinguished readily by shape of the rostrum alone (cf. Figs. 3-8).

Two extremes in head shape occur in our fauna: one is brachycephalic, in which the anteocular region is condensed and displaced somewhat dorsal, forming a sort of hump above insertion of the rostrum, *Empicoris* and *Stenolemus* show this shape, and in both genera the 2nd joint of the rostrum is subglobose enlarged just as in our two genera of Saicinae. The opposite extreme – dolichocephaly – occurs in *Emesaya*, in which the head is long and subcylindrical with only minimal division into two regions. In this genus the 3rd rostral segment is greatly elongated: twice as long as the basal two combined. The middle ground is occupied by *Barce*, the head of which most resembles that of non-emesine reduviids, and in which the three rostral segments are subequal in length and unmodified. In *Ploriaria*, the 2nd rostral is twice as long as the 1st and 3rd combined. One must assume that, being the result of natural selection, these various modifications reflect feeding strategies.

A noteworthy peculiarity of this subfamily is the articulation of the thorax at about its midlength, with the posterior unit inserted into the sleeve-like posterior end of the anterior (Fig. 15). This feature is best developed in *Ploriaria* and *Barce*, in which a virtual ball-and-socket joint is achieved. It is least evident in *Emesaya* (but still represented by a prominent ventral suture line) and *Empicoris*, in which the thorax is not elongated.

Current information about the biology of these insects suggests that many of them are sedentary predators, and some are known to be cleptoparasites on spider webs, which they are able to negotiate without becoming entangled. Many species are associated with the shelter provided by the loose bark and foliage of trees; some are found so frequently in cellars, barns, and other outbuildings as to have earned the descriptive terms "domestic" and "peridomestic."

The higher classification of the subfamily has been treated in an elegant monograph by P. W. Wygodzinsky (1966), which also listed the known world species and portrayed many of them in superb drawings and photographs. This account recognized six tribes, 86 genera, and 898 species, with the caveat that only a start has been made in the discovery of the actual fauna in the tropical regions. The Nearctic fauna was treated in 1925 by McAtee & Malloch, whose arrangement was adapted in somewhat modified form in Blatchley's 1926 manual (which still provides an important introduction to the identification and study of our local fauna).

Because of their small size and delicate structure, emesines are not always easy to prepare for study. Specimens originally collected in fluid (by pitfall or Malaise traps) frequently have the wings damaged, twisted together, or otherwise distorted, and care and patience are required to draw them out of the fluid onto a bit of absorptive paper in good condition: the wing apices especially tend to flex backward onto the base. If quantities are adequate, perhaps part of a series could be pointed in the usual way, and some retained in 70% alcohol.

So far we have documented five genera and 10 species in the Virginia fauna, several of them from a single specimen. Several others almost certainly, on the basis of their known distribution, await in-state discovery. Recent experience has shown that small heteropterans which could never have been anticipated as part of our local fauna may be collected here at sites far removed from their known ranges. This may be borne out again by some of the smaller and rarely-collected emesines like species of *Empicoris*. Virtually any species known from eastern United States may be found as disjunct native populations in Virginia.

Of the genera occurring in Virginia, *Empicoris* has the least filiform body, and its general resemblance to *Saica* both in that respect and by form of the head and rostrum reflects the traditional close placement of the Emesinae and Saicinae.

Key to the Virginia genera of Emesinae

1. Thorax deeply constricted and elongated near mid-length, producing a "dumbbell" shape (Fig. 17); tibiae

- of 1st legs with a row of black spines similar to those of the femora; entire body, but especially legs and antennae, densely invested in long, pale, woolly setae; apex of hemelytra emarginate *Stenolemus*, p. 18
- Thorax not modified as described above; tibiae without slender black spinules on the ventral surface; body and legs not tomentose; apex of forewings evenly rounded 2
- 2. Ventral spines of the profemora extend entirely to the base of the podomere (Fig. 16); trochanter of 1st legs with either a distinct spine or a spur *Ploiaria*, p. 17
- Ventral spines of profemora begin at about a third of the length from base; trochanters of 1st legs without spur or spine 3
- 3. Head long and slender without prominent transverse division, anteocular half as long as postocular; 3rd joint of rostrum longer than the basal two combined (Fig. 8); body length usually greater than 25 mm *Emesaya*, p. 12
- Head shorter and compact, with prominent deep transverse groove on dorsal side, the anteocular division usually by far the shorter; 3rd joint of rostrum much shorter than length of basal two combined (Fig. 3); body length less than 25 mm 4
- 4. Anteocular region of head abbreviated and displaced dorsad, rostrum appearing to originate directly between the eyes (Fig. 6); thorax only slightly elongated, distance between 1st and 2nd legs only about twice that between 2nd and 3rd, no articulation present; mesonotum with a slender erect median spine; body small, less than 8 mm *Empicoris*, p. 12
- Anteocular region of head normally extended in front of eyes (Fig. 6); thorax greatly elongated with the distance between 1st and 2nd legs at least three times than between 2nd and 3rd, a prominent articulation at midlength; mesonotum invisible, and without spine; body larger, more than 10 mm long *Barce*, p. 9

Genus *Barce* Stål

Slender, long-legged insects, notable for the great elongation of the prothorax, which is provided at midlength with a distinct but apparently inflexible articulation (presaging the condition seen in *Ploriaria*); wide separation of the anterior and middle legs; near equivalence in anterior and posterior halves of the head; and approximately equal length of the three rostral segments.

Wygodzinsky (1966: 440) recognized seven species in this genus, two of them described by him as new. Most are endemic to the United States, but one extends southward into northern South America, another is native to the

West Indies. Since both of the new species were described from only a very few specimens, it seems likely that future collecting will produce not only additional localities for them, but still more undescribed species.

Prior to Wygodzinsky's revision, four species were recognized within the bounds of the most common and widespread form in eastern United States, *B. fraterna*. Finding the characters used to distinguish these nominal taxa to be mutable and not diagnostic, Wygodzinsky considered the names *annulipes* Stål and *banksii* Baker to represent geographic races of *fraterna*, and *normae* Elkins a strict synonym of *banksii*. However, he stated the distribution of these nominal subspecies only in the most general terms, with extensive sympatry implied, which militates against the principle of allopatry that normally defines subspecies. A fuller account of this situation in the Virginia populations of *fraternus* is provided in the treatment of that species.

On working with unidentified specimens of *Barce*, the inexperienced can be misled into sorting more species than actually exist. In this genus the conditions of aptery, brachyptery, and macroptery may occur in mature adults (genitalia evident) of a single species, reflected not only in the wings themselves but structure of the thorax, color pattern, and surface texture. *Barce fraterna* is an exemplar of this confusing polymorphism, as discussed under that species heading.

Key to the Virginia species of *Barce*

1. Clypeus without an acute projection at base of the rostrum (do not confuse the small, acute labrum, which also projects forward in many specimens, with the clypeal process) *werneri*, p. 11
- Clypeus with an acute projection at base of rostrum (Fig. 6) 2
2. Pale undersurface of head extending laterally to lower edge of eye 3
- Pale undersurface of head narrower, not touching lower edge of eye 4
3. Legs generally uniform pale light brown or yellowish, apex of femora and base of tibiae each with a single dark ring *fraterna fraterna*, p. 10
- Legs distinctly annulated, both femora and tibiae with from 3 to 5 dark rings *fraterna annulipes*, p. 11
4. Color uniformly dark brown; length 7-10 mm; apex of terminal tergite in females entire *uhleri*, p. 11
- Color straw-yellow; length 11-12 mm; apex of terminal tergite in females with a small median notch *neglecta*, p. 11

189a. *Barce fraterna fraterna* (Say)

Figure 6, Map 3

Size variable, in Virginia material length ranging from 9 to 13.5 mm, the largest specimens are females. Color various shades of light brown, intensity and distribution of pigment is influenced by degree of wing development. Antennae, and rostrum lighter, yellowish to tan, femora and tibiae normally a clear uniform stramineous, with a single dark apical femoral band and basal tibial dark ring.

The status of the two names *Ploiaria fraterna* Say, 1832, and *Barce annulipes* Stål, 1866, is still not resolved after nearly a century of dissentious usage. McAtee & Malloch (1925: 88,89) considered them to represent two closely related but valid species of *Metapterus*, generally more or less allopatric although sharing a common range in central eastern United States. Specimens which they assigned to *annulipes* came from localities between Maine and Virginia (largely coastal) but also extending westward as far as Iowa, Wisconsin, and Manitoba. Material cited for *fraternus* was taken from Long Island to Florida and Texas, but with a few from Ohio, Kansas, and Nebraska. In their account of this genus, McAtee & Malloch distinguished the two nominal taxa by coloration of the legs, in the males, by a slight difference in shape of the genital capsule ("hypopygium").

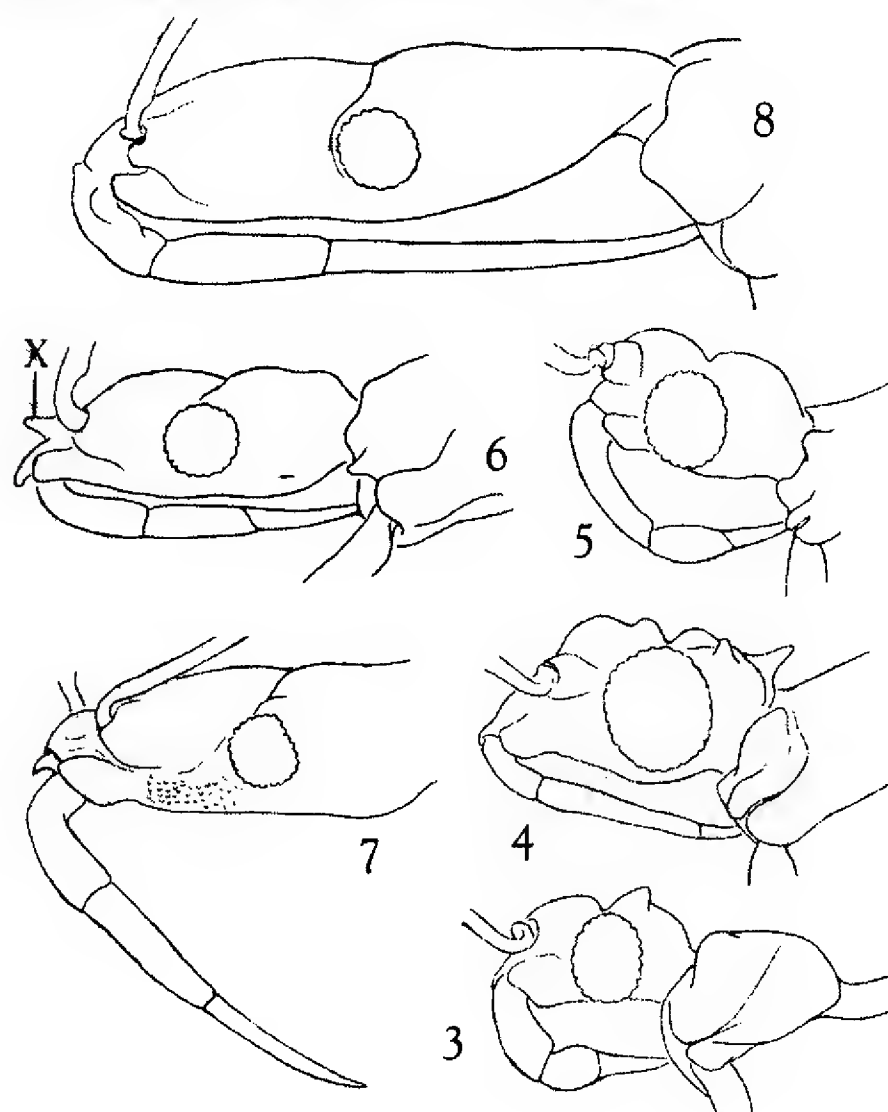
A few years later, Blatchley (1926: 532) accepted the foregoing arrangement entirely, but introduced a biogeographic inconsistency in recording *annulipes* from three places down the entire length of Florida. Froeschner (1944) documented both species from Missouri, with apparent broad overlap, and with syntopy in Clark County in the extreme northeastern corner of the state.

Wygodzinsky's monograph of the Emesinae restored the generic name *Barce*, and adopted a conservative stance on the composition of *fraterna*, of which *annulipes* was down-ranked to the level of subspecies (1966: 443), the two distinguished solely by coloration of the legs and non-overlapping body length. The ranges of both were said to include "Central and eastern United States" with "southern" added for *fraternus*. The incongruity of Blatchley's Florida records for *annulipes* was not addressed.

Material from Virginia at my disposal generally supports the premise of a subspecific, allopatric relationship. The utility of leg coloration is compromised in some samples taken in pitfall traps by apparent fading, perhaps the effect of dilute formalin used as a component in the preservative. Specimens with clear and unambiguous annulations (dark distal femoral and basal tibial rings) are from the Coastal

Plain and lower Piedmont, viz., Essex, Greenville, Henrico, Northampton counties and the cities of Richmond and Virginia Beach.

Adult specimens from the preceding localities suggest a bimodal seasonal activity (or at least an earlier Spring arrival) four specimens being taken in April-June, and ten in October-December. Midsummer activity is indicated only by a single specimen taken in August.



Figures 3-8. Heads, lateral aspect, of emesines. 3. *Empicoris tuberculatus* (Banks). 4. *Ploiaria hirticornis* (Banks). 5. *Stenolemus lanipes* Wygodzinsky. 6. *Barce fraternus fraternus* (Say). 7. *Barce weneri* Wygodzinsky. 8. *Emesaya brevipennis* (Say). X, median apical projection of clypeus, not present in *B. weneri*. All drawings made to same scale.

189b. *Barce fraterna annulipes* (Stal)
Map 4

Differing from the preceding taxon only by the leg coloration as specified in the key to species, and a slightly smaller body size.

As perceived by divination from published sources, this subspecies ranges widely from Quebec to Manitoba, southward as far as Missouri in the interior, and at least to Virginia in the east. The status of *annulipes*-like material reported by Blatchley from Florida remains to be assessed.

In Virginia, it appears to be confined to the mountains and western Piedmont. Specimens referable to *annulipes* have been seen from Alleghany, Augusta, Campbell, , Dickenson, Fairfax, Henry, Montgomery, Nelson, Pittsylvania, Rockingham, and Warren counties. In these bugs, the annulation of the legs can be seen with the unaided eye. Adults have been taken sporadically throughout the year, peaking in late Fall: March (1), June (2), July (2), August (1), September (1) October (2), November (2), December (3).

Perhaps intergradation with nominate *fraterna* occurs in central Virginia, as suggested by specimens with ambiguously marked legs from Culpepper, Cumberland, and Halifax counties.

[*Barce neglecta* McAtee & Malloch]

Length 11-12 mm. Color generally straw-yellow. Pro-femora with four brown spots on each side, protibiae with two brown rings. Surface texture of abdomen fine subparallel longitudinal striae.

Described from Lakehurst, N. J, also Staten Island and White Plains, N.Y., and Winchester, Mass. The species is included because Lakehurst is only 130 miles from the "Eastern Shore" counties of Virginia, not an exceptional distance for a southward extension of range among these poorly-known insects.

190. *Barce uhleri* (Banks)
Map 5

One of the smaller local members of the genus: length varying from 7 to 9 mm. Body dark brown to nearly black, head, antennae, and legs paler, yellow of ventral surface of head narrower than interocular distance. Surface texture of abdominal segments reticulate or vermiculose.

The range is northern: Massachusetts west to South Dakota and Alberta, south to Oklahoma in the midwest, and to Southern Pines, N.C. in the east, from where described. The only Virginia locality known to me is Vienna, Fairfax Co., cited by McAtee & Malloch on the basis of a USNM specimen.

189. *Barce weneri* Wygodzinsky
Figure 7, Map 6

A small member of the genus, length 9 mm (♂♂) to 10 mm (♀♀). Body a nondescript light brown with little pattern evident aside a light postocular stripe and irregular brown and orange reticulation of the abdominal dorsum. Abdominal terga with distinct coarse longitudinal striation. Both sexes are wingless in our material.

This species was described from specimens taken in Louisiana and Georgia, and to my knowledge has not been recorded elsewhere. However, four specimens (2♂♂, 2♀♀) collected in southeastern Virginia agree so closely with the detailed original description (Wygodzinsky, 1966: 445) that their identity as *weneri* cannot be doubted. The known range is herewith extended some 600 miles to the northeast from Folkston, Georgia.

The Virginia specimens bear the following collection data: **City of Virginia Beach:** First Landing (Seashore) State Park, "mesic pitfall site", 19 May 1989, K. A. Buhlmann (1♂); Oceana Naval Air Station, 3 May 1989, K. A. Buhlmann (1♂). **Northampton Co.:** Savage Neck Dunes Natural Area Preserve, Eastville, interdunal pond drift fence site, 20 May-24 June 1999 (1♀), same site, 24 June-28 July 1999, A. C. Chazal & A. K. Foster (1♀).

Genus *Emesaya* McAtee & Malloch

A genus of 12 species, all endemic to the New World from Argentina to Massachusetts. Of the five species listed for the United States, four are restricted to Florida, Texas, and California. Only one is widespread east of the Great Plains and extends far northward.

McAtee & Malloch stated (1925: 75) that the generic name ". . . is intended to combine a reminder of the long familiar term [*Emesa*, in which our species was first described] with a tribute to the pioneer American naturalist Thomas Say."

192. *Emesaya brevipennis brevipennis* (Say)

Figure 8, Map 7

The largest local species of Emesinae. In our material, females are 32-35 mm in length, males 28-30 mm. Both sexes are winged, but the wings do not attain caudal end of the abdomen. Body various shades of brown, antennae and legs reddish-brown with distal band on femora and basal band on tibiae piceous, the "knee" area in between conspicuously white.

This interesting "stick insect" has a wide range in North America: New England to Florida, west to Mexico and California, north in the interior to Michigan and Kansas. A more southern subspecies, *E. b. australis* McAtee & Malloch, occurs from Florida to Panama, but it apparently sympatric with the nominate form in most of Florida and its taxonomic status therefore requires investigation.

In Virginia, *brevipennis* is probably statewide but we have relatively few localities documented: Albemarle, Alleghany, Fauquier, Fairfax, Grayson, Lee, Loudoun, Louisa, Mecklenburg, Montgomery, Nelson, New Kent,

Patrick, and Rappahannock counties, only New Kent being in the Coastal Plain. The species extends as high as 5000 feet at Mount Rogers.

Our few adult capture records range from August to October.

Published information on habitat, summarized by Hagerty & McPherson (1999) suggests that the species is a general vagrant and seems not to prefer any particular biotope. Blatchley considered it to be "usually gregarious where found" but that has not been my experience in Virginia.

Genus *Empicoris* Wolff

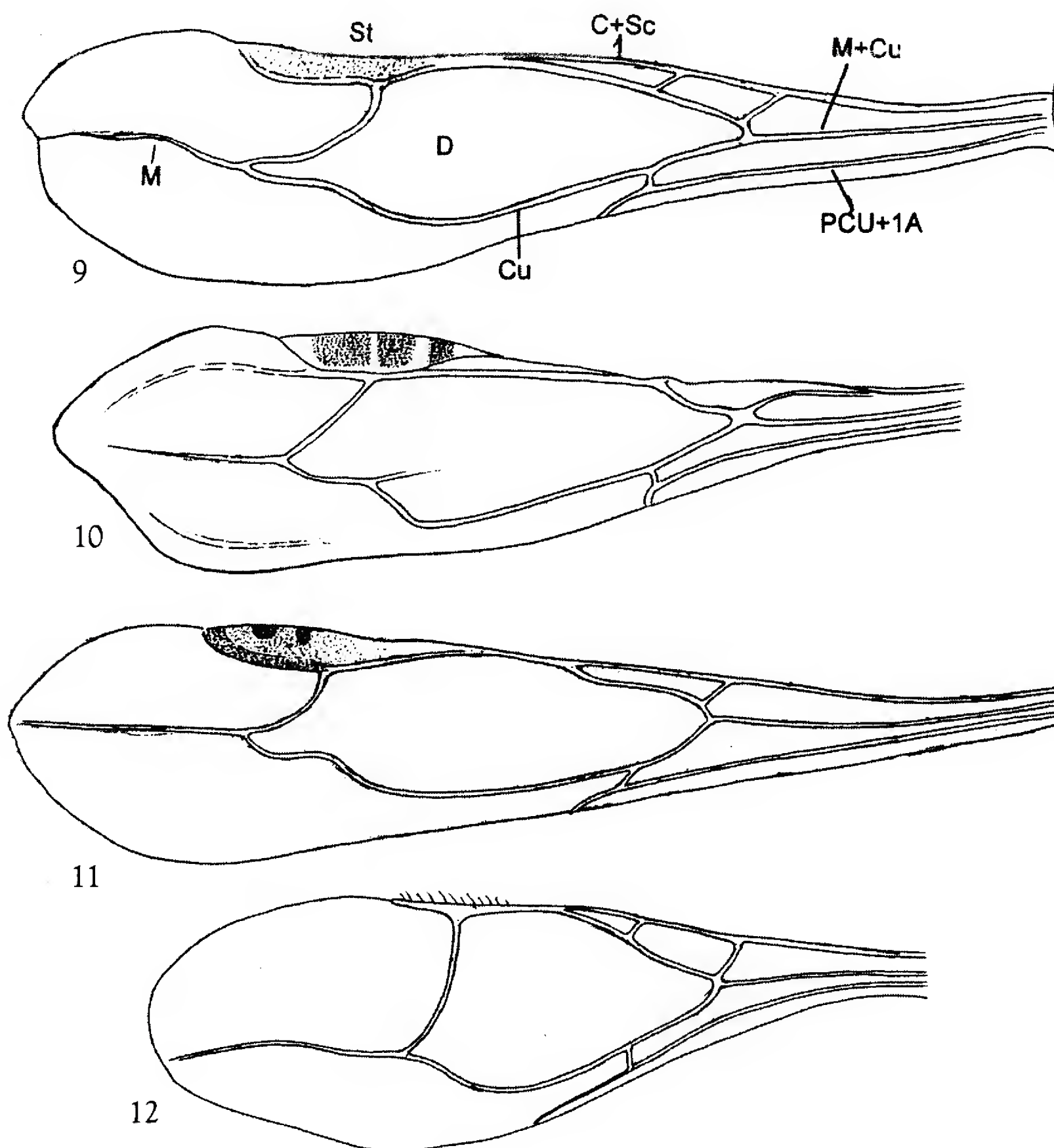
Small emesines, length of Virginia species 5.0 mm or less (to tip of elytra). Head short, preocular region elevated above upper level of eyes (Fig. 3), latter large and coarsely faceted; 2nd segment of rostrum swollen at base. Anterior lobe of pronotum narrower than width of head across eyes; posterior lobe without humeral spines; meso- and metathorax and 1st abdominal tergite with slender erect median spine. Femora of 1st legs only moderately thickened, ventral side with numerous fine sharp spines intermixed with stout setae. Wings typically long and slender, apical half or third with small dark square spots, venation as shown in Fig. 9.

The genus has a world-wide distribution, with about 55 recognized species. Some of these are cosmopolitan, others known only from a single locality. Wygodzinsky records 13 species from the United States, at least five of which are known to occur in Virginia.

This genus of small emesines represents the least known group of local reduviids: the animals themselves are small and not often collected, they are not always easy to distinguish, and there exists conflicting opinion about the applicability of several names. The treatment of *Empicoris* is therefore somewhat more detailed than for most other local taxa.

An interesting aspect of the group is the very wide distribution of several species. *E. rubromaculatus* is essentially cosmopolitan, *orthoneuron* is general in both North and South America, and *vagabundus*, *pilosus*, and *culiciformis* appear to be Palearctic species introduced and established in eastern North America. Presumably synanthropic transportation is the primary factor in such distributions.

In order to examine the elytral stigma, if all four wings are closely appressed to the abdominal dorsum, it is often possible to relax them by applying a tiny drop of alcohol to the basal region, allowing a few minutes for softening, and then, working under a stereomicroscope with a no. 1 insect pin, carefully lifting the uppermost of the two forewings.



Figures 9-12. Forewings of four species of *Empicoris*. 9. *E. orthoneuron* McAtee & Malloch, with venation identified. 10. *E. culiciformis* (DeGeer). 11. *E. rubromaculatus* (Blackburn). 12. *E. winnemana* McAtee & Malloch.

This action will usually separate also the corresponding hind wing from the abdomen, and permit adequate inspection of the wings and venation. Backlighting is often helpful to bring out the veins.

The stigma, formed by enlargement of the costal vein at the point where it is joined by the medius (Fig. 9, C, M),

varies in structure and is important in distinguishing the species. In *E. rubromaculatus*, vein C is usually red in color, and its outer edge is explanately broadened. In *E. orthoneuron*, the stigmal region is distinctly broadened; whereas in *winnemana*, the costal vein is not in the least enlarged to form a discrete stigma, and is merely pigmented (Fig. 12).

In the five species I personally examined, the forewings are generally similar in four, but of a distinctly shorter and broader form in *winnemana*, in which a stigma is essentially absent, and the shape of the discal cell is different from the others. In other insect genera, a departure of this magnitude is frequently the basis for separate generic status, and perhaps a revision of *Empicoris* might justify such recognition in this case.

There has been some dissention concerning application of several names in this genus, in particular the identity of Say's name *Ploiaria errabunda*. McAtee & Malloch (1925: 24) proposed to associate it with the species described by Banks as *Ploiariodes tuberculata*. Blatchley (1926: 520), however, felt that *errabunda* was the same species as later named *Ploeariola parshleyi* by Bergroth in 1922, and that *tuberculatus* was a valid, different species. McAtee himself (1927: 277) conceded that "Since agreement on the identity of *errabundus* seems unlikely, and no type is extant, it may be best to drop this name and use *tuberculatus* Banks and *parshleyi* Bergroth, the type specimens of which are extant." This course allows usage of recognizably proposed names and avoids the controversy that goes with any interpretation of *errabunda*. Wygodzinsky (1966: 373) followed McAtee & Malloch's nomenclature, while recognizing Blatchley's alternative proposal.

Key to Virginia species of *Empicoris*

1. Lateral carina of pronotum abbreviated, present only at anterior region of hind lobe; profemora without true spines on ventral side; red or pink color generally present near pterostigma (usually vein C is so colored); head without paramedian light stripes *rubromaculatus*, p. 16
- Lateral carina extending to humeral region of hind pronotal lobe; red pigment never present on costal region of pterostigma; head normally with two paramedian light stripes..... 2
2. Thorax with a distinct, dark colored median tubercle on the rear margin *tuberculatus*, p. 16
- Thorax without median tubercle, or if present, only rudimentary 3
3. One or more of the profemoral spines are nearly as long as diameter of the femur (Fig. 14) *parshleyi*, p. 15
- Profemoral spines do not approach femoral diameter in length 4
4. Pterostigma rudimentary, linear, black (Fig. 12), discal cell short and broad *winnemana*, p. 16
- Pterostigma broader, subovoid (Fig. 11), discal cell elongate..... 5
5. Lateral carinae of prothorax ending anteriorly in a small

- white projecting lobe (Fig. 13); pterostigma of elytra uniformly darkly pigmented..... *orthoneuron*, p. 14
- Lateral carinae of prothorax without anterior projecting lobe; pterostigma with two or three dark spots *culiciformis*, p. 14

193. *Empicoris culiciformis* (DeGeer)

Figure 10, Map 8

Length of Virginia specimens 4.5-5 mm. Head and thorax brown, abdomen light brown basally, becoming darker distally. Rostrum all pale. Antennomere I dark with about four small narrow pale rings; legs pale with four or five darker femoral rings, tibiae with up to about ten. Forewing with 8-12 squarish black spots on the apical third (distad of stigma) distinctly more darkly pigmented than the more proximal spots, median half of wing dilute brown; stigma with two or three dark markings (Fig. 10). Thoracic lateral carina prominent and sharply defined. Prefemora with five or six slightly enlarged basal spines, setation sparse.

This cosmopolitan species has been recorded from several widely dispersed states, including Virginia. VMNH has only two specimens, both from the southwestern end of the state. **Fairfax Co.** Vienna and Falls Church, numerous collections (McAtee & Malloch 1925: 23). **Montgomery Co.:** Radford Army Ammunition Plant, 14 July 1952. **Carroll Co.:** New River at Rte. 606 bridge, ca. 1.6 km east of Fries, 30 July 1976, C. R. Parker.

E. culiciformis may be expected to occur sporadically almost anywhere in Virginia.

194. *Empicoris orthoneuron* McAtee & Malloch

Figures 9, 13, Map 9

Length to 4.5 mm. Our most attractive member of the genus, *orthoneuron* sports sharply-defined coloration; head and thorax dark brown, each with two light paramedian stripes, rostrum ringed with light brown; basal antennomere with 9-10 dark rings of varying intensity. Abdomen dark brown, spiracles and anterior corners of segments white; a midventral stripe of dark pubescence.

As defined by Wygodzinsky, this name includes *E. reticulatus* of McAtee & Malloch, the type locality of which is Cordova, Mexico. The allotype was from Guatemala and *reticulatus* was listed also from Plummer's Island, Maryland, Falls Church, Virginia, Mississippi and Massachusetts. The name *orthoneuron* was based on material from California, and Wygodzinsky added records for as far south as Argentina. The species must be anthropochoric, like

rubromaculatus. Our three specimens are from opposite sides of the Chesapeake Bay.

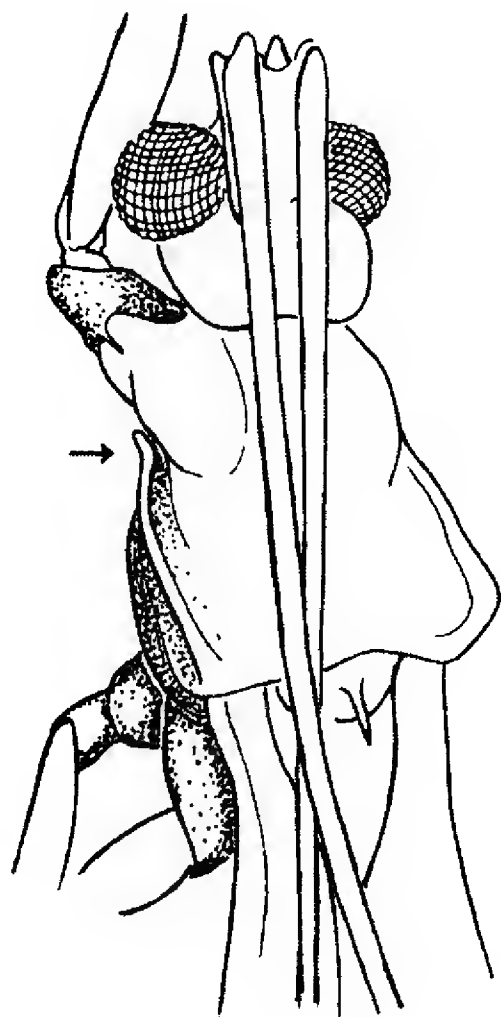


Figure 13. *Empicoris orthoneuron* McAtee & Malloch, forebody in oblique dorsolateral aspect. The arrow indicates the projecting anterior end of the lateral carina characteristic of this species.

Essex Co.: 1.5 km SE of Dunnsville, 26 July 1991, D. R. Smith, malaise trap (1). **Northampton Co.:** Savage Neck Dunes Natural Area near Eastville, 28 July-27 August 1991, S. M. Roble, pitfall (1); 9 July 2004, A. C. Chazal, UV trap (1).

There is some variation in expression of the tablike projection of the lateral pronotal carina, as already discussed by Wygodzinsky and illustrated in his Fig. 112, EE-MM. In one Virginia specimen examined, the tab is conspicuous on one side, missing from the other.

195. *Empicoris parshleyi* (Bergroth)

Figure 14, Map 10

Length 4.1 mm (one specimen). Head and thorax reddish-brown, abdomen light brown. 1st antennomere and femora of meso- and metathoracic legs with about 8-9 indistinct black dots and rings; tibiae with as many as 20. Prothoracic carina fine, complete, without anterior tab. Profemora with two or three prominent slender basal spines, approximating width of the podomere, with a row of about 6-8 much shorter spines up to about midlength.

Falls Church, Fairfax Co., is the type locality for this species, which is known to occur from New England west as far as Michigan and south to Virginia. VMNH has but a single specimen, with the following data. **Lee County.** The Cedars Natural Area Preserve, about ten km west of Jonesville, 22 July 2004, C. S. Hobson, UV trap. A statewide distribution is implied by the two known localities.

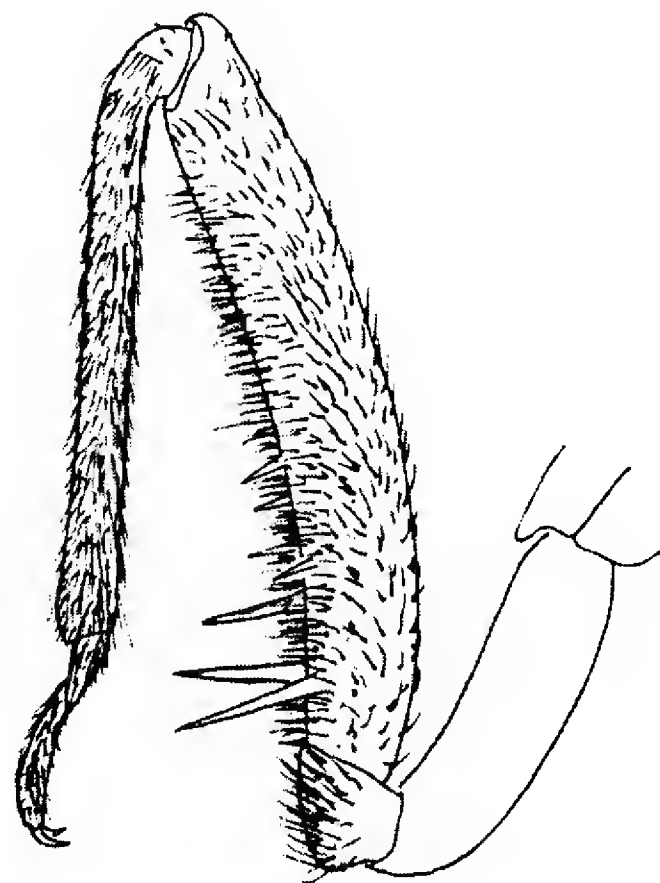


Figure 14. *Empicoris parshleyi* (Bergroth), foreleg showing long basal spines.

Blatchley stressed the statement in Say's description of *errabunda* that the two basal spines of the profemora are much more prominent than the others, to justify associating that name with *parshleyi*. This is certainly true of our specimen, as Fig. 14 shows clearly, but as noted elsewhere I consider *errabunda* unrecognizable with confidence at present.

196. *Empicoris rubromaculatus* (Blackburn)

Figure 11, Map 11

This species is the empicorid most often collected in Virginia, and one of the easiest to recognize because of the red color of the stigmal region and very short lateral pronotal carina. Length 4.5 – 5.0 mm. Profemoral spines small and short, largely concealed by the normal pubescence. Body light yellowish brown, abdomen darker distally; pronotum sometimes with two paramedian light lines. Prefemora with three-four dark bands, mesofemora with about eight, the apicalmost largest. Entire forewing surface ornamented

with black squares and blotches of variable size and shape.

A cosmopolitan (anthropochoric?) species, *rubromaculatus* has been recorded from localities entirely across North America. Most of the Virginia records are for the Coastal Plain, only one (Martinsville) is from the western Piedmont. It should occur essentially statewide, however. **Dinwiddie-Nottoway Cos.:** Fort Pickett, 9 July 99 (3). **Essex Co.:** 1.5 km SE of Dunnsville, Malaise trap, 27 June 1991 (2), 2 July 1991 (2), 11 July 1991, (1), 26 July 1991 (9), all D. R. Smith. **Henry Co.:** Martinsville, 13 November 1992 (1). **Northampton Co.:** Savage Neck Dunes Natural Area, Eastville, 24 June 1999 (1); 28 July 1999, A. C. Chazal and A. K. Foster (1). **City of Hampton:** 22 July 1973, D. Simonet (VPISU 1). **City of Richmond:** Derbyshire Road, west Richmond, May 1990, W. H. Mitchell (1). **City of Suffolk:** Suffolk, 23 September 1941, L. D. Anderson (VPISU 1). **City of Virginia Beach:** Cape Henry, 11 September 1932, L. D. Anderson (VPISU 1).

Most collections are from midsummer (June-August) with a few in May, September, and November.

197. *Empicoris tuberculatus* (Banks)

Figure 3, Map 12

Easily recognized among the local members of the genus by the prominent dark-colored median projection on the caudal margin of the thorax. Anterior end of prothoracic carina with projecting lappet. Length to 5.00 mm. Body various shades of brown dorsally, ventral surface sooty black, densely clothed with fine appressed pubescence, abdomen ventrally with numerous rounded punctations, spiracles and sometimes a space on the edge before them white. Antennae pale, 1st article with six to eight spots or rings; procoxae immaculate or with two dark spots; profemora with three to four well-defined dark spots or rings; meso- and metafemora and tibiae white with small, widely spaced dark spots.

This widespread Nearctic species was described from Long Island, N. Y., and Falls Church, Virginia. It was recorded from Herndon, Virginia, by Wygodzinsky (1966: 373). The currently known range extends from New England to Washington and Oregon, southward as far as Georgia and Texas.

Dinwiddie Co.: Fort Pickett, west of Shacks Hole pond, 2 July 1999, A. C. Chazal & A. K. Foster, UV trap (1). **Halifax Co.:** Dan River floodplain at Paces, three miles NW of Turbeville on Rte. 658, 16 August 1992, UV trap (1). **Isle of Wight Co.:** Blackwater Ecological Preserve, seven km S of Zuni, 1 July 1994, S. M. Roble, UV trap (2); 4 April 1999, S. M. Roble, UV trap (1). **Mecklenburg Co.:** Elm Hill Wildlife Management Area, DF site near Kerr

Dam, 17 August 1991, VMNH survey (1). **Northampton Co.:** Savage Neck Dunes Natural Area Preserve, SW of Eastville, 9 July 2004, A. C. Chazal, UV (1) **City of Suffolk:** South Quay pine barrens, ca 10 km southeast of Franklin, UV trap in mesic woods, 24 May 2004, S. M. Roble (1).

The few collection dates suggest a spring-summer activity period, April-August, so far with no captures for later in the year.

This is the species identified with *errabundus* of Say by McAtee & Malloch. In view of the different interpretations of Say's name by these authors and W. S. Blatchley (to whom McAtee later acquiesced), probably the most expedient solution is to declare *errabundus* unidentifiable with present knowledge of the genus.

[*Empicoris vagabundus* (Linnaeus)]

Recorded by McAtee & Malloch (1925: 18) as a peridomestic in the District of Columbia; whether the species exists as a viable established population in that region remains to be established. Specimens captured in Virginia would be identified in the foregoing key as *culiciformis*, from which it differs in lacking black spots on the pterostigmal region. However, confirmation should be sought by reference to the numerous detailed drawings of this species provided by Wygodzinsky (1966: fig. 115A-X).

198. *Empicoris winnemana* McAtee & Malloch

Figure 12, Map 13

Length 4.5 mm mm. Virginia specimens almost uniformly light yellowish brown, annulation of legs and antennae indistinct, but profemora with three darker bands, the distalmost darkest; meso- and metafemora with dark apical ring. Abdomen with or without black square markings at outer end of segments. The extreme reduction of the elytral pterostigma is diagnostic, and broader wing membrane and shape of the discal cell differ strikingly from other local species (cf. Figs. 11 and 12). Profemoral armature consisting solely of dense black macrosetae, no true epidermal spines are present.

The species was described from specimens taken at Plummer's Island, Maryland, and nearby Vienna, Virginia. Wygodzinsky added a record for Storrs, Connecticut, and McPherson one for Shannon Co., Missouri (1991b) and two counties in Michigan (1991a). VMNH has material of *winnemana* from **Chesterfield Co.:** Swift Creek at US Hy 360, 10 October 1982, berleseate (1). **Essex Co.:** 1.5 km SE of Dunnsville, malaise trap, April 1987 (1), 11 July 1991 (2), D. R. Smith. **Halifax Co.:** Difficult Creek Natural Area Preserve, 11.5 km east of Scottsburg, 8 November

2005. **Henrico Co.:** Elko Natural Area, 10 km southeast of Sandston, pitfall trap, 6 November 1989, C. A. Pague (1). Collection dates are insufficient for any generalization, except that the April capture suggests overwintering either as adults or late instar nymphs.

Although nothing is known of the preferred habitat, it must be fairly generalized since our Virginia specimens were taken by three quite different collecting techniques.

Genus *Ploiaria* Scopoli

Medium sized emesines characterized especially by the presence of spines for the full ventral length of the profemora, spined trochanters of the prolegs, and greatly elongated 2nd rostral segment. The thorax is curiously formed, with a flexible articulation at about the midlength, the posterior element extended *into* the anterior rather than fused with it. That this union permits free movement is attested by the various angles assumed there by dried specimens, as well as by manipulation of alcoholic specimens.

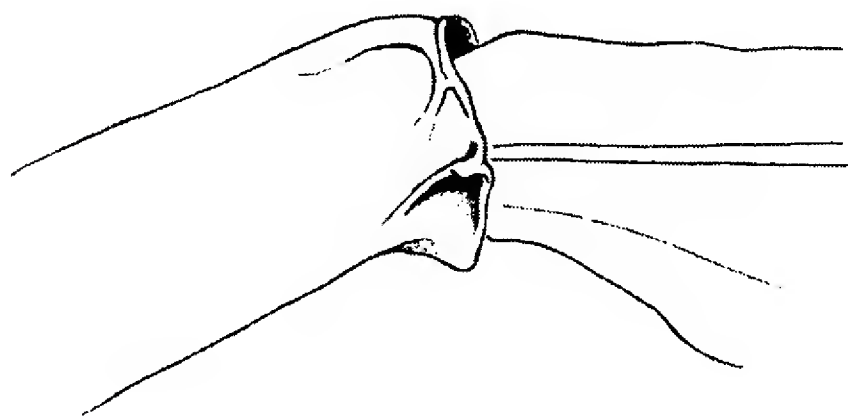


Figure 15. *Ploiaria hirticornis* (Banks), lateral view of thorax, showing median articulation.

Ploiaria is a large genus even by insect standards, with 122 species listed in the Maldonado-Capriles catalog. The vast majority of these occur in the tropics, and only 12 are recorded for the United States. Most of these are western in range, and only two are known for Virginia.

Key to the Virginia species of *Ploiaria*

1. Head with a prominent, caudally directed median spine and a smaller acute tubercle placed behind and above each eye; antennae of males with numerous long silky hairs *hirticornis*, p. 17
- Head without spines and tubercles; male antennae glabrous..... *carolina*, p. 17

199. *Ploiaria carolina* (Herrich-Schaffer) Map 14

Recorded length 4.5-6.0 mm, our single adult specimen is a male 6.4 mm long. Color generally dark brown, top of head and pronotum with median light stripe and scutellum with a white spot; procoxae, rostrum, and underside of head almost yellow. Forewings uniformly dark. Profemora dark brown, with yellow band at apical two-thirds; profemoral spines dark, somewhat longer than their whitish pedicels.

This is apparently an uncommon species. Blatchley recorded only single localities in Georgia and North Carolina, and two in Florida. Brimley (1938: 72) added Wilmington, N.C., without mentioning Blatchley's record for the state. The Henry & Froeschner catalog lists "S.C." (perhaps an amplification of the original type locality "Carolina"). The NCSU collection has material from Bladen, Davidson, Iredell, Johnston, and Wake counties, North Carolina, although the vicinity of Wilmington is still apparently the northernmost published locality.

VMNH has two specimens of *carolina* from **City of Virginia Beach:** First Landing (Seashore) State Park, 23 June-6 July 2003, Robert Vigneault, adult male; same locality but "dune" pitfall site, 5 July 1989, K. A. Buhlmann, last stadium nymph. This is a northward extension of some 225 miles (360 km), as well as a new state record for the species.

The sampling effort at Seashore State Park involved three pitfall arrays of four buckets each, operated for a period of 13 months. That only the single *carolina* was trapped suggests either a small population size or that this technique is not suitable for the species (although it is fairly effective for *P. hirticornis*, a female of which was captured in the same pitfall and trapping period as the *carolina* male).

200. *Ploiaria hirticornis* (Banks) Figures 15-16, Map 15

Most of our 38 specimens are close to 6 mm in length; the smallest (a male) is 5.3 mm, the largest (a female), 6.4 mm. All 14 of the females at hand are apterous, seven of the males are apterous, 17 fully-winged. Posterior element of pronotum with two well-defined light paramedian bands; scutellum without white basal spot; forewings pale brown, with areolated pattern of darker pigment.

Blatchley commented (1926: 525) "Described from Southern Pines [N.C.] and recorded only from there, the District of Columbia, and Louisiana", to which he added his own collections from Dunedin, Florida. Apparently nothing has been published to augment this sparse record

Genus *Stenolemus* Signoret

A large, nearly cosmopolitan genus (61 species listed by Wygodzinsky) of rather bizarre-looking bugs in which the pronotum is deeply constricted and elongated near its midlength ("pedunculate"), the posterior arc of the forewing is emarginate, and the thorax and legs are densely invested in long setae. Four species are recorded for the United States, occurring from North Carolina and Florida to Arizona.

201. *Stenolemus lanipes* Wygodzinsky Figures 5, 17; Map 16

Originally described under the name *Stenolemus hirtipes* by McAtee & Malloch, this species was so treated in Blatchley's manual. However, this name had been previously used for another species, and was replaced by Wygodzinsky in 1949 with the equally descriptive term *lanipes* ("wooly-footed"). The habitus illustration obviates the need for a verbal description: no other insect in Virginia resembles this one.

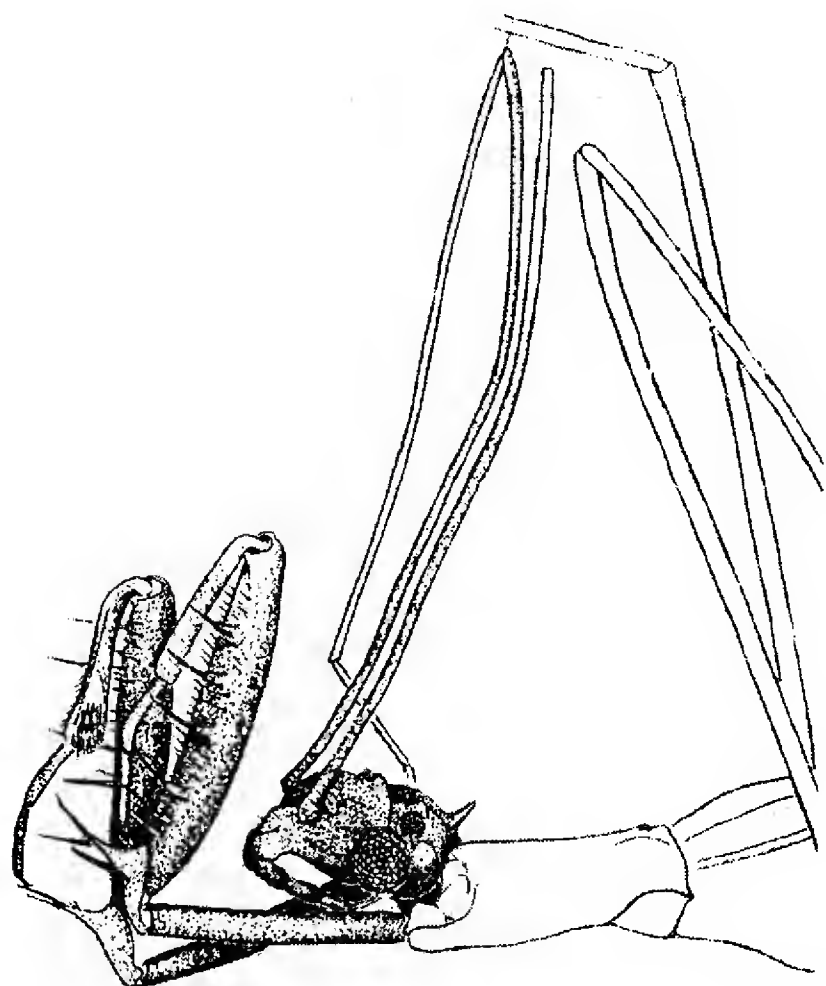


Figure 16. *Ploiaria hirticornis* (Banks), forebody, anterior lateral aspect, showing greatly elongated procoxae and spined trochanters.

beyond Brimley's record (1938: 00) for Greensboro, N.C. and those by McPherson for Shannon Co., Missouri (1991: 263) and Union Co., Illinois (1999: 150). However, *P. hirticornis* seems not to be rare in Virginia, and VMNH has material from Accomack, Cumberland, Dinwiddie, Essex, Halifax, Isle of Wight, Mecklenburg, Northampton, Nottoway and Prince William counties, and the cities of Richmond, Suffolk, and Virginia Beach. A basically lowland distribution – Coastal Plain and outer Piedmont – is thus implied although in North Carolina *hirticornis* has been found as far inland as Greensboro in the western Piedmont (NCSU).

Collection dates range from early May to October, with the distribution May (1), June (3), July (7), August (8), September (9), and October (2). Captures are about evenly divided between pitfall and UV light traps, with a notable gender bias. Pitfall trapping in Cumberland County, for instance, produced one winged male and eight wingless females, whereas only UV light trapping in Nottoway-Dinwiddie counties (Fort Pickett) yielded ten winged males and no females.

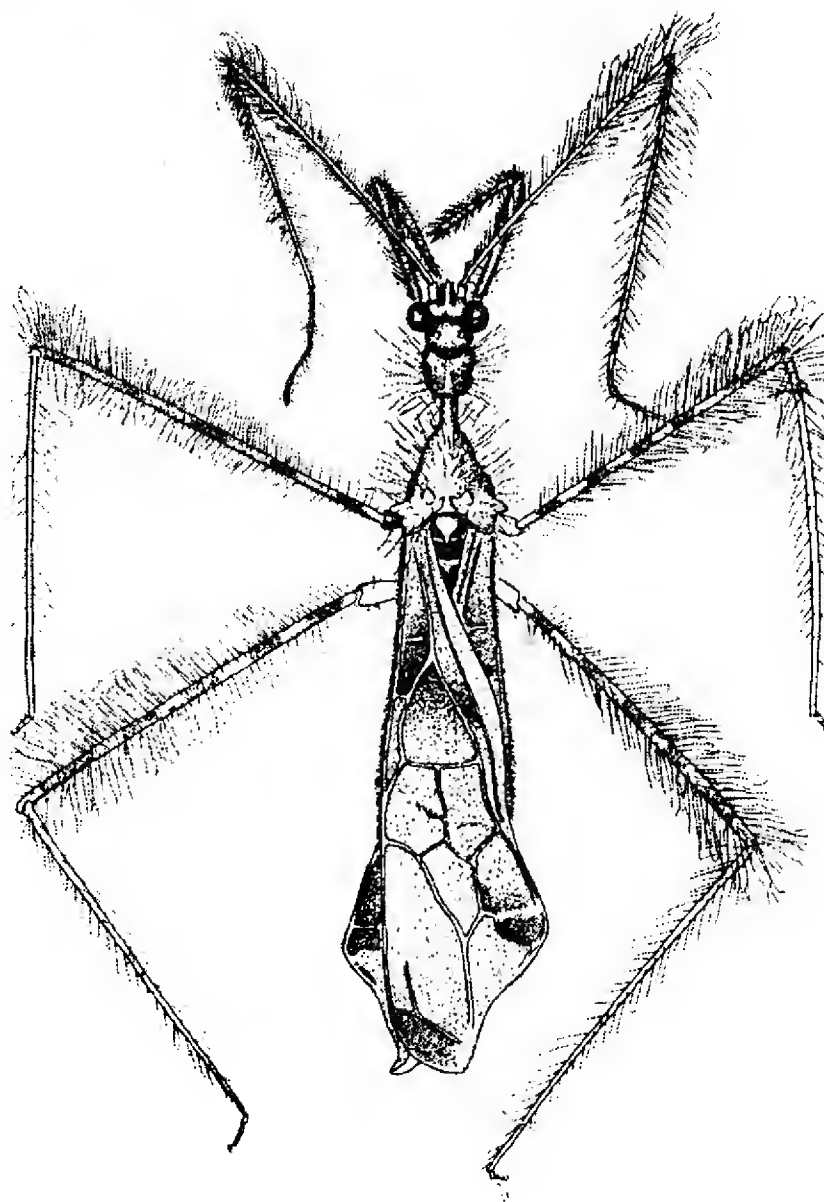


Figure 17. *Stenolemus lanipes* Wygodzinsky.

The species has been documented for North and South Carolina, Florida, and Mississippi. Our material extends the range northward into southern Virginia:

Henrico Co.: Derbyshire Road, west Richmond, summers of 1990 and 1993, W. H. Mitchell (11); Avalon Drive, west Richmond, 30 August 1992, S. M. Roble (1). **Henry Co.:** Martinsville, 17 September 1990, Courtney R. Carter (1). **Prince Edward Co.:** Hampden-Sydney College, 20 September 1990, A. Lowe (1). **City of Chesapeake:** 9 July 1973, collector not specified (1).

Although Richmond is at the northern extremity of the known range, *lanipes* is apparently not uncommon there. Wendy H. Mitchell obtained the series of 11 at her kitchen window over several summers and Dr. Roble's specimen came from the same general area.

Several differences in wing venation have been noted between the original drawing by McAtee & Malloch (1925: fig. 26) and our local material. In all, the discal cell is subdivided by small but still quite evident veins, and more significantly, the apex of each forewing is provided with a distinct, branched vein which I presume represents the radial sector as shown in Wygodzinsky's figure (1966: fig. 5,i) for *Stenolemoides arizonensis*.

Subfamily III. STENOPODAINAE.

Anteocular region of head usually much longer than postocular. Basal antennomere usually the largest and directed anteriorly ("porrect"). One or two cells of the forewings are, with rare exceptions, darkly pigmented; most genera have a sharp midventral abdominal carina.

This group is dominantly tropical in distribution, with a total of 113 genera listed by Maldonado Capriles (1990). The New World taxa were revised by Barber (1929-1930) and many of these genera have been redescribed and updated in a series of elegantly illustrated papers by Giacchi (1969-1988), culminating in a comprehensive key to the genera (Wygodzinsky & Giacchi, 1996).

The species of eastern North America were treated in detail by Blatchley (1926). This reference remains very useful for identification, with the corrections that the species he treated as *Schumannia mexicana* was renamed *Ctenotrachelus shermani* by Barber in his monograph of the subfamily, and what Blatchley called *Stenopoda cinerea* has been renamed *S. spinosula* by Giacchi. Four of the five genera known from Virginia are treated in the "How to know the true bugs" by Slater & Baranowski (1978).

Local species of Stenopodainae are collected at lights more frequently than those of any other subfamily. This fact is presumably a reflection of nocturnal feeding activity, not manifested in, e. g., most of the Harpactorinae.

Key to the Virginia genera of Stenopodainae

1. Apex of 1st antennomere extended beyond origin of 2nd (Fig. 25); juga (mandibular plates) projecting far in front of base of rostrum; femora and tibiae of 1st legs with long slender spines.....*Pnirontis*, p. 22
- Apex of 1st antennomere not extended; juga not projecting anteriorly to base of rostrum; tibiae without spines, femora unarmed or with only short acute tubercles on ventral side..... 2
2. Thorax elongated, distance between pro- and mesocoxae about 3X as great as between meso- and metacoxae; anteroventral surface of prothorax widely flared laterad with edge strongly spinose, exposing base of coxae in anterior aspect; front lobe of head about 2X as long as posterior; femora of posterior legs not surpassing abdominal apex..... *Ctenotrachelus*, p. 19
- Thorax not elongated, bases of all three pairs of legs about equidistant; anteroventral surface of prothorax not widely flared and denticulate 3
3. Thorax with four elevated longitudinal carinae, each set with a single row of stout, pedicellate spinules; apex of protibiae with elongate, linear pad; large animals, body over 20 mm in length..... *Stenopoda*, p. 25
- Thorax without elevated spinose carinae; protibiae without apical fleshy pad; body length less than 20 mm 4
4. 1st antennomere broader apically than at base and slightly curved; 3rd and 4th antennomeres abruptly much more slender than 2nd, and together only half as long as 2nd; ocelli large, placed on median tubercle and elevated above level of anterior part of head; clypeus with two erect, thin, paramedian lobes 5
- 1st antennomere equally slender throughout (or very slightly broader at midlength) and straight; 2nd-4th much more slender than 1st; clypeus without two elevated lobes; ocelli smaller, not placed on an elevated tubercle; projection of anterior pronotal corner elongate, digitiform..... *Pygolampis*, p. 24
5. Profemora incrassate, with ventral row of spines; metatibial setae short, declivent except at distal fourth; anterior pronotal projection short, bluntly triangular *Oncocephalus*, p. 21
- Profemora scarcely thicker than mesofemora and without ventral spines; metatibiae clothed in long setae standing perpendicular to tibial surface over entire length, about 3X as long as tibial diameter.....*Narvesus*, p. 21

Genus *Ctenotrachelus* Barber

Ctenotrachelus differs from other regional genera of Stenopodainae by the displacement anteriorly of the 1st pair

of legs (reminiscent of their placement in Emesinae) and especially by an interesting modification of the procoxal acetabulum. The ventral edges of propleura and mesopleura - in the region of their commissure - are flared outward to form a hoodlike covering over the coxal base that is entirely separated from the dorsal coxal condyle, a modification apparently occurring synapomorphically with the Neotropical genus *Ocrioessa* (Giacchi 1985). Among the local genera, the presence of an apical protibial pad is shared with *Stenopoda*, but the shape is quite different: convex and oval in *Ctenotrachelus*, linear and elongate in *Stenopoda*. These two genera seem to have little else in common.

In addition to *C. shermani*, *Ctenotrachelus* is represented by one species in Mexico and 13 in South America (Maldonado Capriles, 1990). The absence of other species in the West Indies, and the lack of records south of Gainesville, Florida, suggests that an ostensible Cuban record for *shermani* might be based on a mislabeled or introduced specimen.

202. *Ctenotrachelus shermani* Barber

Figures 18-19, Map 17

Maximum length 11-12 mm, no sexual dimorphism in size evident; both sexes fully winged. Color uniform light brown overall, the only dark color being the eyes, antennae, apical tibial annuli, a longitudinal stripe along the thorax just above leg bases, and scutellum. Judged from published information, *Ctenotrachelus shermani* appeared for years to be one of the rarest reduviids of North America. It was originally recorded from Raleigh, North Carolina by W. S. Blatchley (1926) under the incorrect name *Schumannia mexicana* Champion. The same name was employed by Brimley (1938), apparently unaware that the Raleigh specimen had been restudied by H. G. Barber during his revision (1929-1930) of American Stenopodainae and relocated into the new genus *Ctenotrachelus* as type specimen of a new species, *C. shermani*.

More recent sources (Froeschner, 1988; Maldonado Capriles, 1990) cite only "N.C." for the species, although the latter author provides an unattributed "[Cuba]" as well.

VMNH has six specimens: **City of Virginia Beach:** First Landing/ Seashore State Park, 5-26 July 1989, K. A. Buhlmann (1); 23 June-6 July 2003, Robert Vigneault (3). **City of Chesapeake:** Northwest River Park, 8 km SE of Hickory, 5-16 July 2004, Robert Vigneault (1). **Greensville Co.:** Fontaine Swamp at US 301, 1.2 km S of Dahlia, 6 June 2002, K. L. Derge (1). The species is thus established as a member of the Virginia fauna, reaching its northernmost known station at the Chesapeake estuary. Possible occurrence on the Eastern Shore must not be discounted.

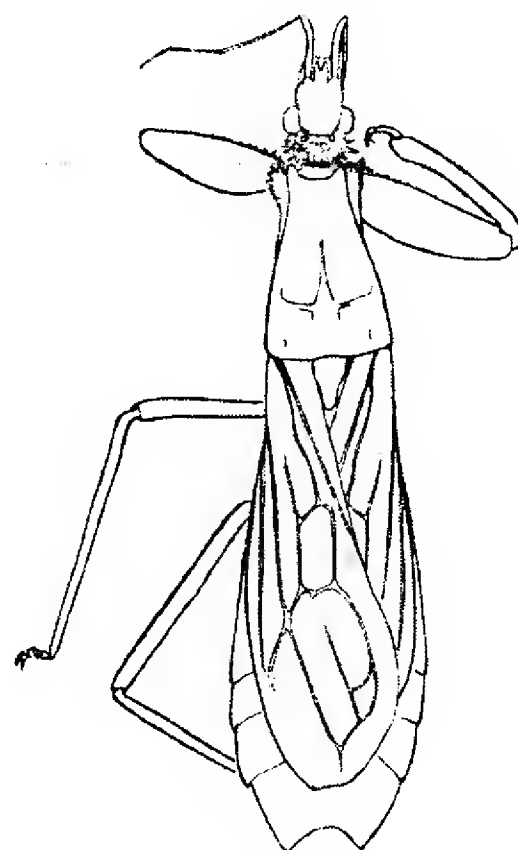


Figure 18. *Ctenotrachelus shermani* Barber.

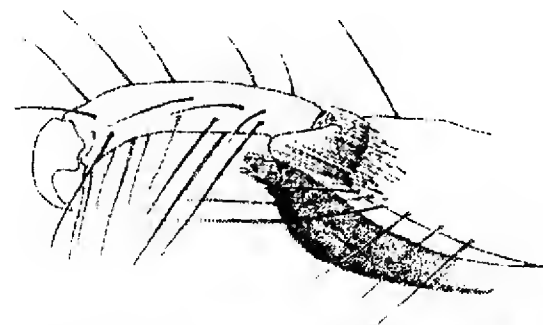


Figure 19. *Ctenotrachelus shermani* Barber. Distal end of protibia showing apicoventral cushion and proportions of the protarsi, greatly enlarged.

That only one specimen was recovered from three drift fence units operated at the site for 15 months suggests that the species does not usually inhabit a soil-litter biotope. Collection data with the other five specimens indicates that light trapping is a more productive technique for obtaining this species.

Suspecting that additional, unreported, material might exist, I inquired of the curators of several insect collections located in southeastern United States. Two such depositories confirmed that material was indeed extant, from six counties in Florida and five in Georgia. That no specimens from Mississippi and Louisiana were located is of interest, since *shermani* has been found at least once in Texas and since individuals are frequently taken at light traps in Florida and Georgia. The 28 specimens for which I have data were taken between 31 May and 7 September, with the vast majority – 19 – taken in June. A map showing the location of the known capture sites has been recently published (Hoffman, 2005).

Genus *Narvesus* Stål

A small (two species) genus very closely related to *Oncocephalus* and *Diaditus*. As the male genitalia are essentially identical in these groups, their diagnosis is based on characters, cited in the key to genera, which seem to reflect scarcely more than specific status.

203. *Narvesus carolinensis* Stal Figures. 20-21, Map 18

A moderately large stenopodine with notable sexual dimorphism in size (Virginia males 12-13.5 mm long, females 14.5-15.5 mm.), wing length (males are full-winged, females' wings do not cover the last three abdominal tergites), and antennae (1st antennomere setose, long, slender, and nearly straight in males, short, subclavate, curved, nearly glabrous in females. There is no sexual dimorphism in profemoral thickness.

This bug is superficially very similar to the following, from which it differs most notably by the slender profemora

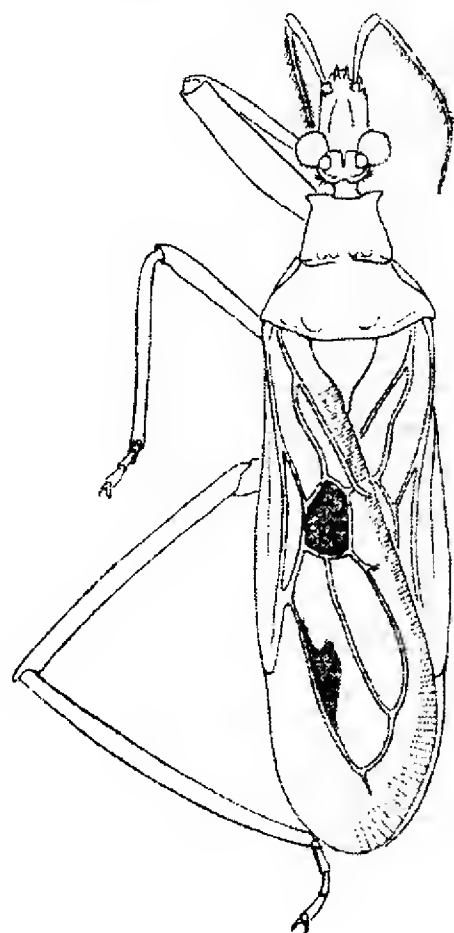


Figure 20. *Narvesus carolinensis* Stål.

and the profuse, long, erect setation of the metatibiae.

Available records suggest that this species is state-wide in distribution at low elevations: none of the localities are above 2000 feet. Alleghany, Cumberland, Dickenson, Floyd, Loudoun, Montgomery, Nottoway, Pulaski, Roanoke, and Rockingham counties, and cities of Norfolk,

Richmond, Suffolk, and Virginia Beach. It is active during the midsummer only, as our 19 specimens were collected in June (13), July (5), and August (1). Virtually all were taken at lights.

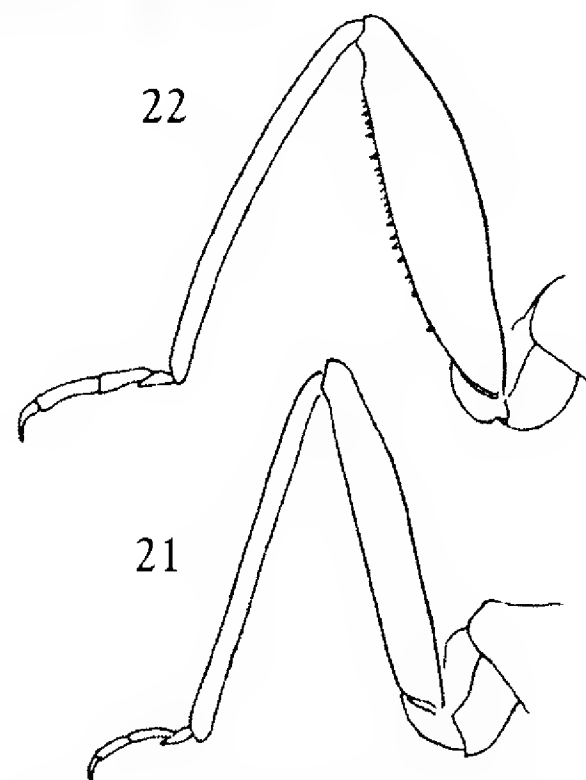
In our material, the wings of females are as long as those of males of equal size, but the abdomen extends farther distad creating a superficial impression of partial brachyptery. Remarkably, the VMNH collection has but a single nymph (in which the metatibial setae are erect as in adults).

Genus *Oncocephalus* Klug

Apparently forming a generic group with *Narvesus* and *Diaditus*, *Oncocephalus* is an exceptionally speciose genus occurring in the tropics worldwide (191 species are listed by Maldonado). Only three, however, extend northward into the United States, and of these, only one is native to Virginia, here recorded for the state for the first time.

204. *Oncocephalus geniculatus* (Stal) Figure 22, Map 19

Length of males averaging about 12 mm, females larger, to a maximum of 15 mm. Body light grayish-brown, thorax and femora usually somewhat darker. General appearance very similar to *Narvesus carolinensis* (Fig. 20), only the profemora incrassate. All of the males are fully winged. Females are either brachypterous or apterous, and their profemora are much thicker than in males, even more so in nymphs, a curious case of allometric reduction of that dimension during growth.



Figures 21 and 22. 1st. Legs of two stenopodine species.
21. *Narvesus carolinensis* Stål. 22. *Oncocephalus geniculatus* Stål.

Documented locality records for this species suggest a lowland range, North Carolina to Texas, and north to Colorado, Kansas, and Illinois. The records for Virginia represent a substantial extension northward and presage discovery of *geniculatus* in Maryland and Delaware.

Accomack Co.: Assateague Island, Wash Flats, 23 July 1998, A. C. Chazal, VDNH survey (1). **Appomattox Co.:** Holiday Lake State Park, 8 June 2002, Robert Vigneault (3). **Charles City Co.:** Lake Charles, 12 June 2004, S. M. Roble (1). **Dinwiddie Co.:** Fort Pickett, 2 km east of Birchin Lake, 5 July 2000, Chazal, VDNH (1); Butterwood Creek, off Lewis Road, 7 July 2000, Chazal, VDNH (1). **Northampton Co.:** Savage Neck Dunes Natural Area, Eastville, 28 July 1999, Chazal, VDNH (1). **Pittsylvania Co.:** 7 km west of Whitmell on Rt. 939, 6 May 1989 (1). **Sussex Co.:** Chub Sandhill Natural Area Preserve, 10 km southeast of Sussex Court House, 9 August 2002, Craig Young (1). **York Co.:** Cheatham Annex Naval Supply Center, 4 September 1989, K. A. Buhlmann, VDNH (1). **City of Norfolk:** Virginia Truck Crops Experiment Station, June-July, L. D. Anderson (VPISU 3). **City of Richmond:** University of Richmond, 2 June 1936 (1); 29 June 1948 (1); 15 October 1946 (1). **City of Suffolk:** Holland, 5 March 1973 (VPISU 2); "Dismal Swamp", 22 September 1973 (VPISU 1). **City of Virginia Beach:** Seashore State Park, 8-14 June 1970 (1); 21 June 1989 (1); 26 July 1989 (1); Stumpy Lake, 15 April 1969 (1); Oceana Naval Air Station, 28 June 1989 (4); Little Creek Amphibious Base, 21 June 1989 (1).

Apparently the Accomack County locality is the northernmost known for this species, only a few miles south of the Delaware state line. I record the capture in Pittsylvania County with some reservation, as it seems out of range, and being a nymphal specimen, cannot be dismissed as an aeolian migrant. Field notes which I made at the time and place mention millipeds and "insects" without being specific about the latter, and extensive collecting in Pittsylvania County during the past decade has not produced a single additional member of this species. Nonetheless, this record is to some extent substantiated by the capture of three adult males at Holiday Lake State Park, also an "inland" locality, so perhaps it is valid.

The species is often taken in pitfalls, particularly wingless females and nymphs of several stadia, in contrast to the condition in *N. carolinensis*, for which we have but one immature specimens. Both species appear to be active as adults during the same time of the year.

Genus *Pnirontis* Stål

Members of this genus are easily distinguished from other local reduviids by the singular antennal structure

(apex of the 1st segment produced far beyond attachment of 2nd), elongated juga, and extremely spinose front legs. When at rest, the antennae are reflexed beneath the head, lying parallel to the rostrum, a posture shared only with *Pygolampis* in the local fauna. These bugs tend to be somewhat flattened in general facies, and of a uniform straw-yellow color; none of the hemelytral cells are pigmented. The abdomen has a prominent, sharp midventral carina.

Specimens of *Pnirontis* are sometimes collected by general sweeping of low weedy fields, but VMNH specimens were more often taken at both incandescent and UV lights. Most species are not, however, frequently collected and known localities are often few and far between. The more extensive utilization of mercury vapor and/or black light trapping in southeastern counties particularly may result in improved knowledge of these curious little bugs in Virginia.

Thirty-three species of this strictly New World genus are recognized, five of which occur in southeastern United States. We have taken three species in Virginia, and a fourth (*P. infirma* Stål) perhaps occurs here as well, as its range is stated to extend northward along the coast to New Jersey. The same three are listed by Brimley for North Carolina, each one from but a single locality.

Key to the Virginia species of *Pnirontis*

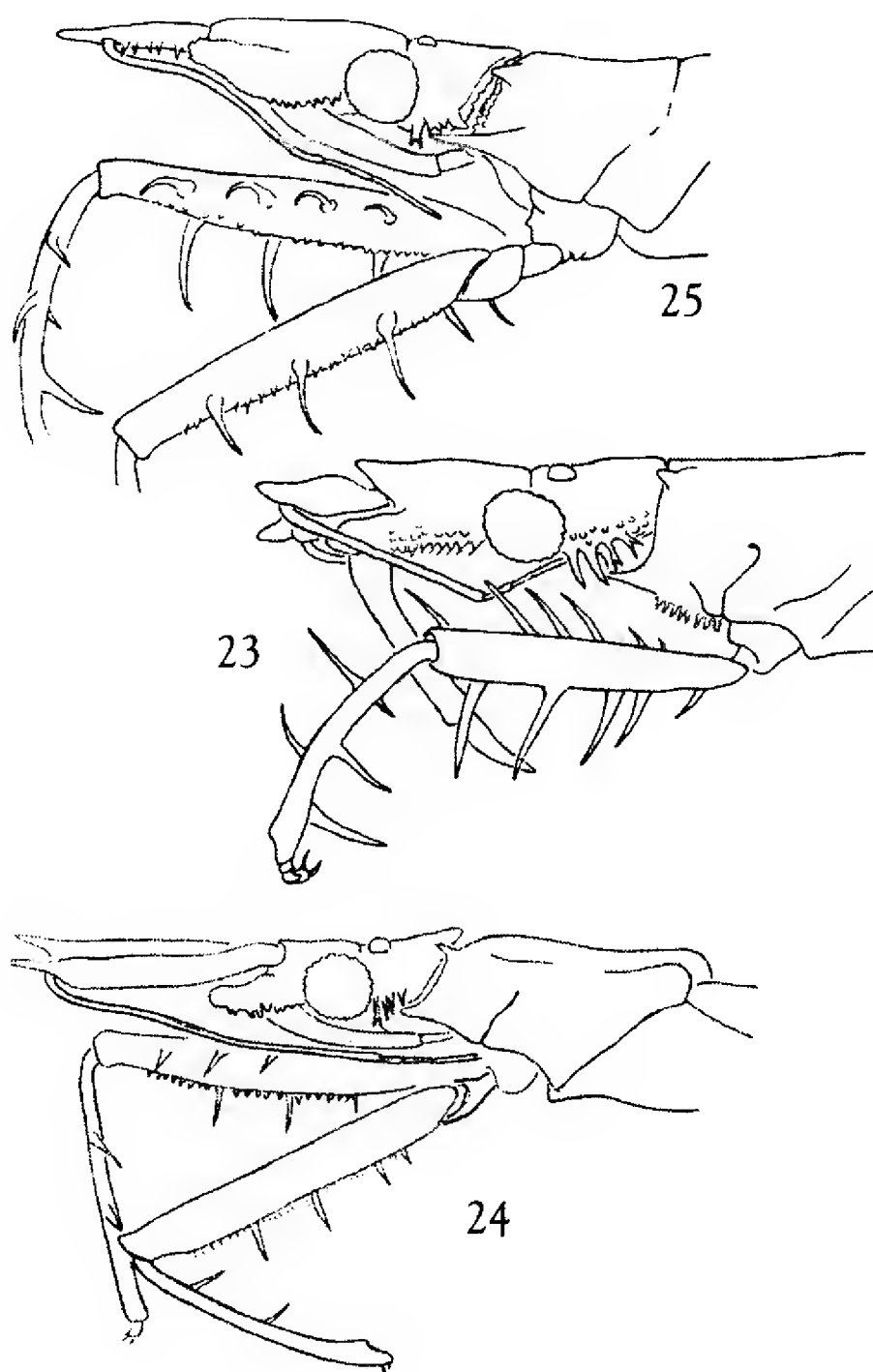
1. Tibiae of 1st legs with spines along inner side only 2
 - Tibiae with spines on both inner and outer sides 3
2. Basal antennomere with spines on the ventral side
 - *infirma*, p. 23
 - Basal antennomere without spines *languida*, p. 23
3. Frons with a single, small, anteriorly-directed median projection between antennae *brimleyi*, p. 22
 - Frons with two slender, appressed median processes between antennae *modesta*, p. 23

205. *Pnirontis brimleyi* Blatchley

Figure 23, Map 20

A small species: male holotype 10.5 mm, Virginia female 11.2 mm. Color uniformly light brown except for black rings at midlength of profemoral spines. Basal antennomere considerably shorter than in the other two Virginia species, about equal to anteocular part of head. A single rudimentary median frontal projection. 3rd legs much shorter than in the other species, when straightened and held posteriad not attaining apex of abdomen. Protibiae with spines on mesal and lateral sides.

This species appears to be localized and rarely collected, known so far only from the type locality (Raleigh, North



Figures 23-25. Head and 1st legs of three species of *Pnirontis*. 23. *P. brimleyi* Blatchley. 24. *P. languida* Stål. 25. *P. modesta* Banks. Drawings made to same scale.

Carolina) and Texas (Froeschner 1988, on what authority I cannot trace). A single specimen from the **City of Virginia Beach**: Dam Neck Navy Base, 7 September 1990, K. A. Buhlmann, agrees exactly with the original description. This record thus extends the range of *brimleyi* ca 160 miles (265 km) northeast of Raleigh. The specimen was taken in a pitfall trap placed in an interdunal swale biotope.

Specimens in the NCSU collection add significant records for FLORIDA: *Alachua Co.*: Gainesville, 16 July 1966 (collector not specified) (1), and NORTH CAROLINA: *Chatham Co.*: Siler City, 5 September 1969, L. L. Deitz (1). The species is thus probably more widespread in the southeast than the few localities would suggest.

[*Pnirontis infirma* Stål]

Historically recorded from as far north as New Jersey, this species has not been collected in either Virginia or North Carolina. Until the New Jersey locality can be confirmed from recent material, or *infirma* finally found in Virginia, I am compelled to list the name here in a strictly probationary status.

206. *Pnirontis languida* Stål

Figure 24, Map 21

Length to 14.5 mm, no sexual dimorphism noted in Virginia material. Color uniform light brown. Basal antennomere equalling head length, without spines or spicules on ventral side. Two slender appressed frontal processes. 3rd legs extending well beyond apex of abdomen. Protibiae without spines on lateral side, but with a broad shallow groove and short subapical distally setose projection

Originally described from Brazil and "Carolina", this species has subsequently been found commonly in southeastern United States from North Carolina south to Florida, west to Texas and north to Illinois, and recorded also from the West Indies and Brazil. The Nearctic distribution corresponds closely with the Atlantic and Gulf coastal plains.

Greensville Co.: DF site 1.6 km east of Claresville 6 October 1993 (VMNH 1). **Mecklenburg Co.**: Elm Hill Wildlife Management Area, 22 August 1992, 21 June 1996 (VMNH 2). **City of Suffolk**: Holland, 21 June 1975, 18 May 1976 (VPISU 2). **City of Virginia Beach**: False Cape State Park, 21 May 1998, 17 August 1998, S. M. Roble, A. C. Chazal, C. S. Hobson (VMNH 4).

These Virginia records extend the range of this bug roughly 200 miles (320 km) northward from Chadbourn, North Carolina (Brimley 1938: 72). All but one of the specimens cited were taken at black light traps, the exception being a female penult nymph taken in Greensville County by sweeping mixed grasses and herbs in a low marshy area.

Specimens of this species in the NCSU collection are from Bertie, Bladen, Columbus, Johnston, Washington, and Wake counties, all in the Coastal Plain of North Carolina.

207. *Pnirontis modesta* Banks

Figure 25, Map 22

Length of Virginia specimens from 11 to 13.3 mm, females averaging about 1 millimeter longer than males; color overall straw-yellow to light brown, pronotum often

a little darker, and the scutellum occasionally almost black. 1st antennomere about as long as preocular region of head, armed with spines and spicules on the ventral side. Two slender, digitiform frontal processes between antennal bases. Protibiae with long spines on both median and lateral sides; lateral side not grooved, a small subapical projection present.

Although not described until 1910, this species is actually the most widespread member of the genus in North America. Banks' original specimens were taken at Falls Church, Virginia; two decades later Blatchley (1926: 545) provided records for Florida and Indiana. The Henry & Froeschner catalog adds Missouri, North Carolina, Texas, and the Greater Antilles, suggesting a lowland distribution, but the species seems to be almost statewide in Virginia (Map 22).

Records are available for Accomack, Alleghany, Bath, Charlotte, Chesterfield, Cumberland, Dickenson, Dinwiddie, Fairfax, Floyd, Franklin, Greensville, Halifax, Henrico, Isle of Wight, Lee, Louisa, Montgomery, Patrick, Pittsylvania, Prince William, Smyth, Southampton, and Sussex counties, and the cities of Suffolk and Virginia Beach. Collection dates range from 26 April to 21 September, the majority falling in June (17) and July (15). Most of the specimens were taken at UV lights near water. A pair from Greasy Creek, 4 km SW of Indian Valley, Floyd Co., represent the highest locality from which the species is known: 2300 ft.

The collection of *modesta* at Clintwood, Dickenson Co. (VMNH 1, 26 June 1971) establishes the species within six miles of the Kentucky state line, almost guaranteeing its presence in that state and West Virginia, and by inference, also in adjoining states to the south.

Genus *Pygolampis* Germar

Antennae porrect, 1st antennomere long, directed anteriorad, sides of head below eye with one or two ramose processes; anterorventral corner of prothorax produced into a slender acute projection. Entire integument invested in dense short pubescence. Dorsum of prothorax with four low inconspicuous ridges suggesting those seen more prominently in *Stenopoda*. Femora of all three pairs with several narrow parallel grooves. Profemora incrassate, their entire ventral length with a broad belt of dense short setae. No midventral carina. No cell of the forewings pigmented.

This large genus is remarkably distributed. By far the great majority of its 90 species are known from the Old World tropics: Africa to Australia, even the southern Palearctic region. By contrast, only six are recorded from the entire Western Hemisphere, two of them restricted to North America or essentially so.

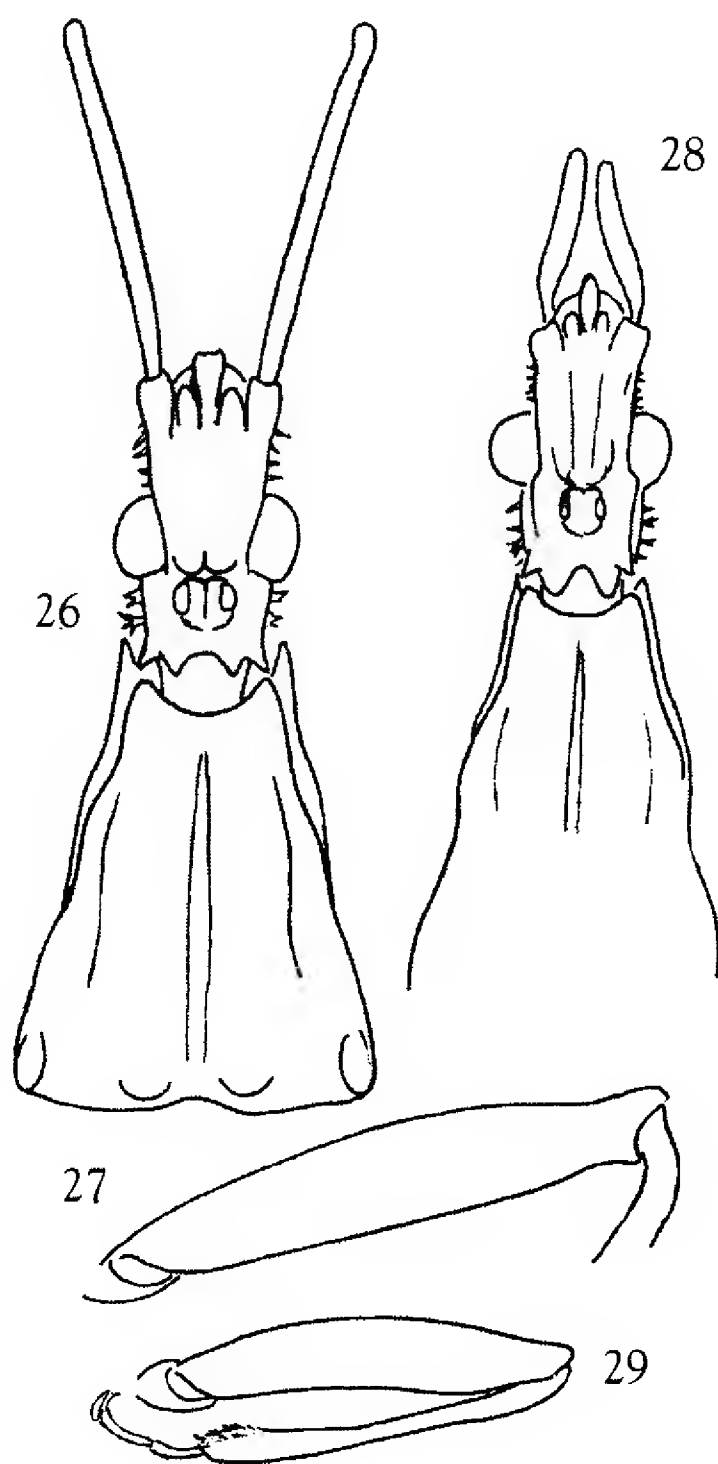
Key to the Virginia species of *Pygolampis*

- 1st antennomere slightly longer than head length (Fig. 26)
.....*pectoralis*, p. 24
- 1st antennomere only half as long as head length (Fig. 28)
.....*sericea*, p. 25

208. *Pygolampis pectoralis* (Say)

Figures 26-27, Map 23

Length to about 16 mm, no consistent sexual dimorphism in size. Color a dirty grayish-brown, with the legs somewhat lighter and occasionally mottled with dark. Forewings dark, but at least one cell with a white central marking. Structural features as noted under the genus heading.



Figures 26-29. Forebody and profemora of two species of *Pygolampis*. 26 and 27. *P. pectoralis* (Say). 28 and 29. *P. sericea* Stål.

This insect is virtually continent-wide, from Maine to Florida, west to California, north in the interior to Michigan and Colorado. It occurs across Virginia, most of the localities at low to moderate elevations, but the Tazewell County site (Burkes Garden) is at 3000 ft. ASL, probably the highest place at which *pectoralis* has been found anywhere in the East. Specimens have been seen from Accomack, Alleghany, Bedford, Charlotte, Cumberland, Dinwiddie, Greensville, Henrico, Montgomery, Nottoway, Orange, Prince William, Tazewell, Warren, and York counties, and the cities of Suffolk and Virginia Beach.

It is apparently a summer-active species: capture dates by month: Jan., 1 (nymph), March, 1, April, 3, May, 9, June, 8, July, 8, Aug., 7, Sept., 1, Oct., 1, Nov., 1. The great majority of specimens were taken at lights.

Most of our winged specimens fall into the body length range of 14.5-15.5 mm; the smallest is a male only 11.5 mm, collected at a UV light trap on 5 July 2000. A 4th (?) stage nymph, collected on 21 January 1954, is 9.2 mm, with small wing pads. It is covered with a layer of soil and was perhaps found hibernating. Lastly, two small nymphs, perhaps 2nd stadium, taken in a pitfall on 15 August 1990, are 5 mm long. These few details suggest overwintering in the immature stages, maturing and mating in late spring, hatching in July. This scenario is consistent with the data of Hagerty & McPherson (1999) for the species in southern Illinois, where a late instar nymph was found in mid-April, and the majority of adults collected in May. Apparently some adults overwinter.

Despite their size and immaturity, the small nymphs are easily identifiable because of the long 1st joint of the rostrum characteristic for this genus in the local fauna. The major structural difference in the nymphs is the much shorter first antennomere, only half the length it will attain in the adult condition.

[*Pygolampis sericea* Stal]

Figure 28-29

Apparently a very rarely collected species, *sericea* has been recorded from an extensive and not entirely plausible range: Massachusetts to Texas, north in the interior to Illinois and Indiana, also for British Columbia. My 1953 records for Virginia were spurious, based upon immatures and females of *Oncocephalus geniculatus*, and no authentic specimens have been found in the state during the past 50 years. The species must be considered as possible for eventual discovery in Virginia, having been taken at Raleigh, North Carolina - only 50 miles south of the state line. However, the Raleigh specimen (NCSU) was captured in 1904, and I have seen no others from North

Carolina despite greatly increased collecting efforts in that state during the past several decades.

Despite the general similarity of this insect to *P. pectoralis*, the difference in length of the 1st antennomere readily separates the two. The ostensibly thicker profemora of *sericea* is not a real character, as comparison of Figs. 27 and 29 will show. In fact, the profemur is also shorter in *sericea*, relative to other body dimensions such as head length. The figures given for these two species were made from specimens of nearly equal size.

Genus *Stenopoda* Laporte

As revised by Giacchi (1969, 1988), this New World genus consists of eleven species, the largest members of the subfamily. In the Virginia fauna, *Stenopoda* is recognized by the large size, elongated anteocular portion of the head, and especially the four pubescent thoracic carinae.

Although a number of species occur in Mexico and the West Indies, apparently so far only one inhabits the United States where, however, it is common and widespread.

209. *Stenopoda spinulosa* Giacchi

Map 24

Stenopoda spinulosa is the largest Virginia species of Stenopodinae, females attaining a length of 27 mm and typically brachypterous; males a few millimeters shorter and nearly always fully winged. The size alone will distinguish the species, to which may be added the features of long legs (metafemora exceeding apex of abdomen), spinose thoracic carinae, and presence of a large apical pad on the protibiae. The animals are usually some shade of light brown, with the scutellum and usually one cell of the forewings black; legs uniformly pale yellowish-brown except apical third of the femora infuscated in some specimens.

For decades, this species was known as *S. cinerea*. In his 1969 treatment of *Stenopoda*, Giacchi restricted this name to a species occurring south of the United States, and proposed the new name *spinulosa* for the more northern form. Regrettably, Giacchi did not provide a key to the ten species he recognized, and the distinctions between *cinerea* and *spinulosa* seem to be expressed chiefly in the male genitalia. Maldonado (1990: 341) listed all of the Giacchi taxa, but *spinulosa* was not entered in the catalog of North American reduviids by Froeschner (1988: 648) even though Giacchi's revision was cited.

Published information suggests that in North America, *spinulosa* occupies a basically austral distribution from New York to Florida, thence westward to Missouri and Texas. It extends southward through Mexico as far as the Yucatan

Peninsula. The records for Michigan (McPherson 1992) are remarkable, when one recalls that Blatchley never found this big species in Indiana during decades of intensive field work. Perhaps it has been expanding its range northward in recent years, as seems to be true for other kinds of insects.

The species is probably statewide in Virginia, although only one of the recorded localities (Sand Mountain, Wythe County) is above 2000 feet ASL. The impression that it does not occur in the southern Blue Ridge (as implied by the inset range map) may be entirely fallacious, although Brimley (1938) also cited only lowland collections.

Alleghany, Appomattox, Augusta, Bath, Cumberland, Dickenson, Dinwiddie, Essex, Fairfax, Fluvanna, Gloucester, Greene, Greensville, Henrico, Henry, King & Queen, Louisa, Montgomery, Pittsylvania, Rappahannock, Rockbridge, Stafford, Sussex, Warren, Wythe, and York counties, and the cities of Chesapeake, Hampton, Norfolk, Suffolk, and Virginia Beach.

The species frequently comes to UV and incandescent lights.

Distribution by month of capture for 56 specimens shows dominantly midsummer activity:

March	1
April	2
May	5
June	16
July	18
August	12
September	2

Subfamily IV REDUVIINAE

The nominate subfamily is one of the larger internal groupings, with 142 genera listed by Maldonado, some like *Reduvius* and *Zelus* being extensively speciose. The group is only marginally represented in North America, however, with a few species of *Reduvius*, *Pseudozelus*, *Zelus*, and *Zeluroides* native to the southwestern states, and the cosmopolitan *R. personatus* occurring over most of the continent. Schuh & Slater (1995: 158) state that the subfamily is "...recognized primarily by the absence of characters occurring in other reduviids; ocelli usually present; discal cell usually absent; tarsi 3-segmented; fossula spongiosa on fore- and middle tibiae; nymphs with 3 dorsal abdominal scent glands."

Genus *Reduvius* Fabricius

Boasting a membership of about 194 nominal species, this genus is nearly worldwide in range, but barely extends

northward into southwestern United States. It is not known whether the single species that occurs in Virginia is a truly Holarctic element, or a successful colonizer brought to our shores during European settlement of the east coast.

Earlier, this subfamily included also the genera now sequestered in the Triatominae and Peiratinae on the basis of rather technical and esoteric characters (encapsulated in the foregoing key to subfamilies). There is a considerable superficial similarity with the peiratine genus *Melanolestes*, but *Reduvius* can be recognized by its overall brown color, smooth integument, prominently visible ocelli, and especially the texture of the meso- and metapleura. Individuals of both these genera are disposed to bite with little provocation.

210. *Reduvius personatus* (Linnaeus)

Map 25

A medium-sized reduviid, 15-17 mm in body length, females averaging about a millimeter longer than males and somewhat stockier in body form. Both sexes are fully-winged and fly rapidly. The color is typically some shade of brown, with appendages a little lighter, and abdomen suffused with reddish. The profemora are only moderately inflated, and provided on the ventral surfaces with a field of long yellow hairs. Pro- and mesotibiae with finely pubescent, eversible apical pads, although distal end of these podomeres is not notably enlarged. Meso- and metapleura with prominent coarse vertical striation; surface of abdominal segments with fine dense transverse striation.

Cosmopolitan as a synanthropic form, this species is essentially continent-wide in North America. Virginia records are from Bedford, Campbell, Dickenson, Fairfax, Fluvanna, Frederick, Greensville, James City, Montgomery, Roanoke, Shenandoah, Warren, Washington, and Wythe counties, and the cities of Norfolk, Richmond, and Suffolk.

Collection dates for 35 specimens indicate an early summer period of activity:

May	6
June	11
July	10
August	5
September	3

That the species overwinters during nymphal stadia is confirmed by a specimen from Chesterfield County, perhaps in the 4th stadium, labeled "chicken lot" with the date 25 February 1971. The Virginia observations conform closely to the information published for southern Illinois by Hagerty & McPherson (1999).

Subfamily V. TRIATOMINAE

This small subfamily (13 genera) occurs in the New World exclusively, except for five species of *Triatoma* known from southeast Asia and the East Indies, a remarkable distribution. Several species of the same genus occur in southwestern United States, and two in the mid Atlantic states. Because of variability in most of the taxonomic characters, a considerable number of nominal subspecies have been recognized, but the majority of these have been reduced to synonymy. The group was carefully monographed by Lent & Wygodzinsky (1979).

Triatomines have been traditionally included by American authors in the Reduviinae, although separated as a distinct subfamily by Jeannel in 1919. Comparison of specimens of *Triatoma* and *Reduvius* shows evident similarity in general body form, antennae, scutellum, and especially the prominent coarse vertical striation of metapleura and fine dense transverse striation of abdominal segments. Differences obtain in the curious head shape of *Triatoma* and eversible tibial pads in *Reduvius*, doubtless reflecting major differences in biology of the two taxa.

The two species of this group found in Virginia are, despite being large and hematophagic, the least known of our native reduviids. Only a few scattered localities are available for them, and I have never collected either one in five decades of local experience. Perhaps more attention to animal nests and artificial aggregations such as chicken houses might be productive. Blatchley found specimens of *sanguisuga* under bark and boards; Hagerty & McPherson (1999) mentioned similar habitats in Illinois, and captures of adults at light. At least in earlier times the bug invaded rural dwellings and fed upon the occupants. In the tropical parts of the New World triatomines represent a serious public health problem, transmitting the blood parasite *Trypanosoma cruzi* with serious or lethal consequences. Eric Day, taxonomist with the Virginia Agricultural Extension Service, advises me that no specimens have ever been submitted to his laboratory by extension agents or concerned individuals.

Genus *Triatoma* Laporte

Members of this genus are sometimes called "cone-nosed bugs" because of the prolonged anteocular head region, seen from the side (Fig. 30), slightly but distinctly upwards. The head itself is noticeably small compared to the broad, robust body. Femora of all three pairs of legs enlarged, with two small subapical tubercles on the ventral surface.

Maldonado (1990) listed 65 species in this genus, all but five restricted to the New World. Two occur in eastern

United States, although specimens have been seen of only one of them.

Key to Virginia species of *Triatoma*

- Rostrum setose, 3rd segment nearly as long as 1st
.....*lectularia*, p. 27
Rostrum glabrous, 3rd segment only half as long as first
.....*sanguisuga*, p. 27

[*Triatoma lectularia* Stal]

In some of the older American literature (including Blatchley, 1926) this species was listed as *Triatoma heidemanni* Neiva. Under one or more names, it has been recorded from a wide range: Pennsylvania to Florida, north to Illinois and Missouri in the Mississippi basin, and west to Mexico and California. Yet, the species appears to be nowhere common, and was not collected in Florida by Blatchley despite years of intensive collecting in that state. Brimley's 1938 records for North Carolina are from the coastal plain of that state, so any Virginia captures are likely to be from the Tidewater region.

211. *Triatoma sanguisuga* LeConte Figure 30-31, Map 26

Virginia specimens average around 20 mm in length, the largest is 22 mm, with an abdominal width of 8.5 mm; there is no evident sexual size difference. The coloration is strikingly harlequin: the body and appendages basically black or piceous, with margins of the thorax, wing bases, and large square spots along abdominal margins red; tarsi and 2nd rostromere are yellow. The front lobe of the pronotum has a deep median pit, the posterior lobe is ornamented with two divergent paramedian ridges and strong transverse striation.

The species is widespread in eastern United States, from Pennsylvania to Florida, thence west to Arizona, north in the interior to Missouri and Ohio. It is however not often collected in Virginia, our few records being from

Dickenson Co.: Breaks Interstate Park, at lights, 1-14 July 2000, Robert Vigneault (VMNH 4). **King George Co.:** Dahlgren Naval Weapons Laboratory, 7 May 1991, C. A. Pague (VMNH 1 nymph). **Montgomery Co.:** Radford, 21 May 1961, Charlotte Reynolds (VMNH 1); same, November 1978, R. Hunt (VMNH 1). **Prince George Co.:** Disputanta, in house, 20 July 1997, Patricia Young (VMNH 1). **City of Richmond:** University of Richmond campus, 28 June 1936, Carroll Williams (VMNH 1); same, at light, 7 July 1935, F. R. Freund; Richmond; 22 August (no

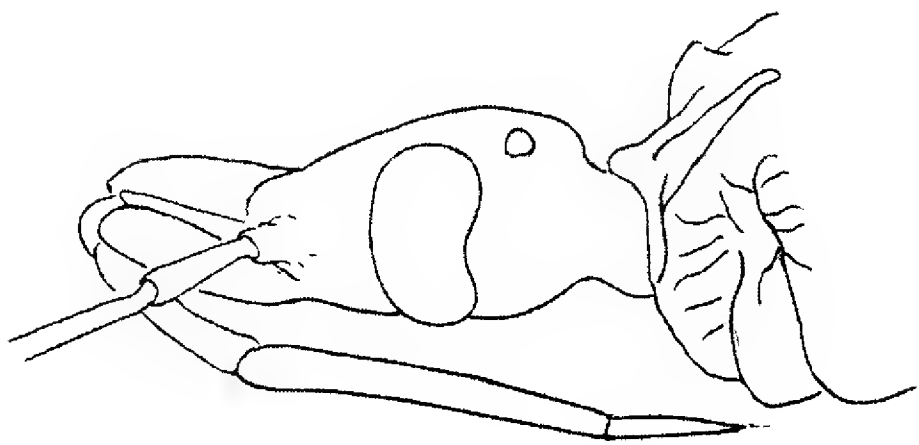


Figure 30. *Triatoma sanguisuga* LeConte, lateral view of head showing upturned anterior region.

year cited), G. W. Underhill (VPISU 1). **City of Suffolk:** Holland, 8 July 1954, A. S. Tombes (VPISU 1). Despite their paucity, these records suggest a statewide distribution, at least at lower elevations.

Nymphs of this species, and presumably also of *T. lectularia*, differ from the adults by the much more incrassate femora, and the dense vestiture of the head and legs with seriate rows of acute, curved tubercles, each with a seta on the inner curvature. This ornamentation is entirely lost in the adults, in which the femora are also much less thickened relative to the size of the body. VMNH has a nymph (2nd stadium?) with a body length of 9 mm, collected on 10-14 June 2002, and another (4th stadium?) of 15 mm, 7 May 1991.

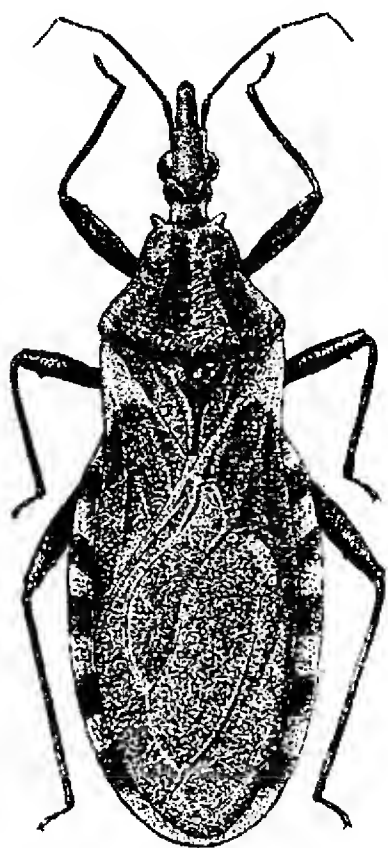


Figure 31. *Triatoma sanguisuga* LeConte. Drawing by Elsie H. Froeschner.

Subfamily VI. PEIRATINAE

In the three local genera of this taxon the anterior lobe of the pronotum has a distinct pattern of grooves - shallowest but still evident in *Melanolestes* - and the parameres are visible above the edge of the genital capsule in males. The first antennomere is short, about equal to vertical dimension of an eye, and the 2nd legs tend to be shorter, with the femora thicker, than usual in the family.

Thirty-one genera are assigned to this subfamily by Maldonado, all of them basically tropical in distribution. A few extend northward into the southern Palearctic region, and even fewer - three only - into the United States. Each of them is represented in the fauna of Virginia by a single species.

The ornamentation of the pronotum is almost identical in *Sirthenia* and *Rasahus*, and these two taxa also share a generally unmentioned trait: a dense field of silvery pubescence on the metapleura just above coxae of the 3rd legs. In both genera, adults are fully winged, against apterous females in *Melanolestes*.

Key to Virginia genera and species of Peiratinae

1. Pronotal grooves very shallow, only just evident; femora of both 1st and 2nd legs strongly incrassate; tibiae of both pairs broadly expanded to accommodate large apical pad. Entire body black.....
.....*Melanolestes picipes*, p. 29
- Pronotal grooves deep and sharply defined; femora of 2nd legs not thickened, tibiae of 1st legs not notably broadened distally with large pad. Body variegated with yellow, orange, or red..... 2
2. Antecular part of head elongated, interocellar space greater than an ocellar diameter; neck without a small tubercle each side; anterior corners of pronotum not set off as a protuberance. 3rd joint of rostrum as long as 2nd, although much more slender. Tibiae of 2nd pair of legs not thickened and without ventral pads. Black, with beak and legs yellow, most of coria red.....
.....*Sirthenia stria carinata*, p. 31
- Antecular part of head short, interocellar space not greater than width of an ocellus; neck with a small but distinct tubercle on each side; anterior corners of pronotum set off as a distinct small projection. 3rd joint of rostrum much shorter than 2nd. Tibial pads of both 1st and 2nd legs narrow, extending entire length of the podomere. Basal area of elytra adjacent to scutellum yellow; membrane brown with large round or oval yellow spot.....*Rasahus hamatus*, p. 30

Genus *Melanolestes* Stål

This small New World genus is represented by six species from Argentina to Québec, the northeasternmost species widespread and abundant in Virginia. Aside from the characters noted above, *M. picipes* differs from its two local relatives by the greatly incrassate femora and tibiae of both the 1st and 2nd legs, the apical tibial pads broad and almost half as long as the entire tibia.

Melanolestes was the subject of a recent revision by Coscarón & Carpintero (1994), in which a second species endemic to eastern North America was recognized. For this entity, the authors resurrected the name *Rasahus picicornis* Stål, 1860, based upon a single female from Rio de Janeiro. I regret being unable to embrace this proposal for several reasons.

1) The identity of this nominal second form, sympatric with *picipes*, was based upon two characters only: that the legs are "bicolorous" and the parameres are less spatulate than in *picipes*. As Stål's type was a female, recognition of the species thus depended upon the leg color. The original description states "...pedibus fusco-piceis, tarsis dilute fusco-brunneus", a somewhat tenuous basis for deriving a bicolored condition. A specimen in the U. S. National Museum collection, labeled as *picicornis* by Dr. Coscarón herself, is uniformly piceous-black, including the tarsi. Examination of about a hundred specimens from throughout the U. S. range of *picipes* did not disclose any with bicolored legs, although their color in the entirety ranged from light brown to black depending on the individual insect. The extent to which the parameres were broadened distally seemed to vary individually as well.

2) The likelihood that a species described from southeastern Brazil would be known elsewhere solely from the eastern Nearctic region is biogeographically implausible, and could only be explained by assumption of mislabeling of the type (for which no evident was presented).

Until such a time that these difficulties can be resolved, I can see no alternative to maintaining the current perception of a single species of *Melanolestes* in our region.

212. *Melanolestes picipes* (Herrich-Schaefer)

Figure 32, Map 27

A black, sexually dimorphic species: males 13-15 mm in length, females 15-18; adult males fully winged, adult females only rarely so, normally with just two small wing pads. Abdomen in either sex bright orange-red or black, sometimes a mottled intermediate combination occurs. The

prothoracic grooving prominent in the two related genera is represented only by vague belts of short pubescence.

The status of this species was uncertain for 150 years following its description, because Herrich-Schaeffer had also named a related form under the name *abdominalis*, considered by subsequent authors to be either a valid species, a recognizable "variety" of *picipes*, or merely a not nameworthy color variant. Finally the situation was subjected to a careful, detailed review by McPherson, Keffer, & Taylor (1991), who concluded that the third alternative was the correct one. The name *Melanolestes abdominalis* now seems definitively removed from further consideration.

This bug is extremely widespread, ranging from Quebec and Minnesota southwest to California, thence through Latin America as far as Brazil. It is not documented for the "Pacific Northwest" states and Montana. Virginia records are for Albemarle, Alleghany, Augusta, Bath, Bedford, Botetourt, Carroll, Charlotte, Chesterfield, Clarke, Craig, Cumberland, Essex, Fairfax, Fauquier, Floyd, Fluvanna, Frederick, Goochland, Grayson, Greenville, Halifax, Henry, Henrico, Isle of Wight, James City, King

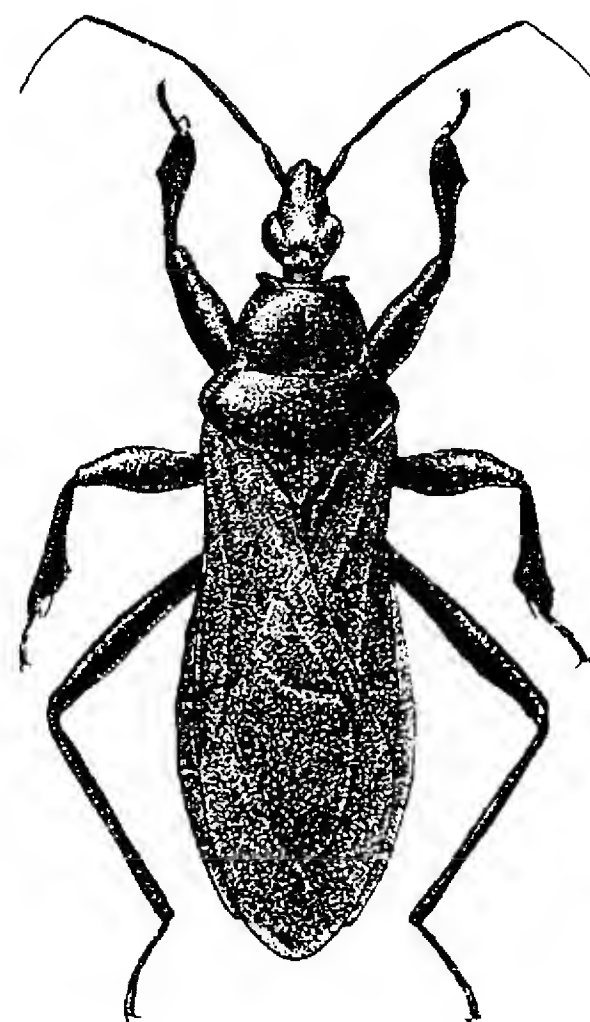


Figure 32. *Melanolestes picipes* (Herrich-Schaeffer). Drawing by Elsie H. Froeschner.

& Queen, King George, Lancaster, Louisa, Mecklenburg, Middlesex, Montgomery, Nelson, New Kent, Northampton, Pittsylvania, Pulaski, Roanoke, Rockbridge, Russell, Scott, Southampton, Stafford, Tazewell, Washington, Wythe, and York counties, and the cities of Chesapeake, Hampton, Norfolk, and Virginia Beach. It is thus the most frequently collected of the state's reduviids, and there can be little doubt that it occurs in every county and city. In the mountains, it has been found as high as 3000 ft. in Burkes Garden, Tazewell Co.

The seasonal activity pattern as reflected in 170 Virginia captures shows a pronounced bimodality, although with a clear vernal dominance:

March	2
April	35
May	50
June	18
July	9
August	11
September	10
October	22
November	12

Are the individuals from March through June the adults of one generation, and August through November those of a succeeding one? There is no obvious reason that this species should not be active during midsummer.

Hagerty & McPherson (1999) document a univoltine life cycle in southern Illinois, where 77% of nearly 300 individuals were taken in April and May (closely paralleling the situation in Virginia)..

It is remarkable that the nymphs of *M. picipes*, an obviously terrestrial generalist predator, are so seldom captured in pitfall traps. VMNH has but a single (3rd stadium) nymph, taken 17 August in York County, and Hagerty & McPherson report a similar disparity in Illinois, only five nymphs in a total of 318 specimens.

Individuals are usually found under cover in fields and other ruderal habitats, rarely in forests. The species is attracted to lights, and frequently adds an element of suspense to night collecting by appearing suddenly and flying around erratically before alighting on the sheet or in the UV-trap (it is possible that a specimen landing on one's body would bite). While normally only one or two make such an appearance, no fewer than 32 were trapped in one evening at Dragon Run, King & Queen Co., on 24 April 1999 (C. S. Hobson, A. C. Chazal, VDNH).

M. picipes is the only reduviid by which I have been personally lanced: a carelessly held specimen inserted its rostrum into the tip of my left index finger. The pain was

instant and intense, and the site remained sore for about two weeks. W. S. Blatchley (1926: 558) also alluded to having been "severely punctured" by *picipes*, and the species' propensity to bite readily seems to be well-known. The combination of robust black body and quick deliberate movements projects the image of a "no-nonsense" insect to be disturbed at one's own risk. Yet one tolerated being brought to me once within the confines of the young collector's closed hand, without punishing such familiarity.

Genus *Rasahus* Amyot & Serville

Elongate peiratinines with prominently engraved grooves on anterior pronotal lobe, eversible tibial pads present on both pro- and mesotibiae, unusual in being narrow and extending virtually to base of tibiae.

Froeschner (1988) listed both this species and *R. biguttatus* (Say) as members of the Nearctic fauna. Blatchley treated both names, but with reservations about their separate specific identities and suspected that *biguttatus* would eventually be considered a junior synonym. Using the characters specified to distinguish them in the generic revision by Coscarón (1983), I find the Virginia material more like *hamatus*, and they are so listed, although I agree with Blatchley that the nominal differences (e.g., more extensive light coloration at the wing bases) are extremely subjective and individually variable.

213. *Rasahus hamatus* (Fabricius)

Figure 33, Map 28

Length 17-20 mm, body slender and elongate. Head, thorax, and scutellum black; abdomen and legs yellowish. Apical half of clavus and adjoining edge of corium yellow, forming a U-shaped basal spot around scutellum; elytral membrane with a rounded-oval yellow spot.

Despite its large size and bold color pattern, *R. hamatus* seems to be only infrequently collected. Froeschner (1988) provided records only for the states of Florida, Missouri, Oklahoma, and Texas. Our material from Virginia thus adds a state to the list, and extends the known range northeastward from central North Carolina. **Dinwiddie Co.:** Fort Pickett, 2 km east of Birchin Lake, 6 July 2000, A. C. Chazal (VMNH 1). **Fluvanna Co.:** without further data on label (USNM 1). **Gloucester Co.:** Glens, Rappahannock Community College, 26 June 1974, collector not specified (VCU 1). **Greensville Co.:** 1 km east of Claresville, end of Rt. 600, 3 June 1993, R. L. Hoffman & J. M. Anderson (VMNH 1). **Isle of Wight Co.:** Blackwater Ecological Preserve, 7 km south of Zuni, 2 June 1998, S.

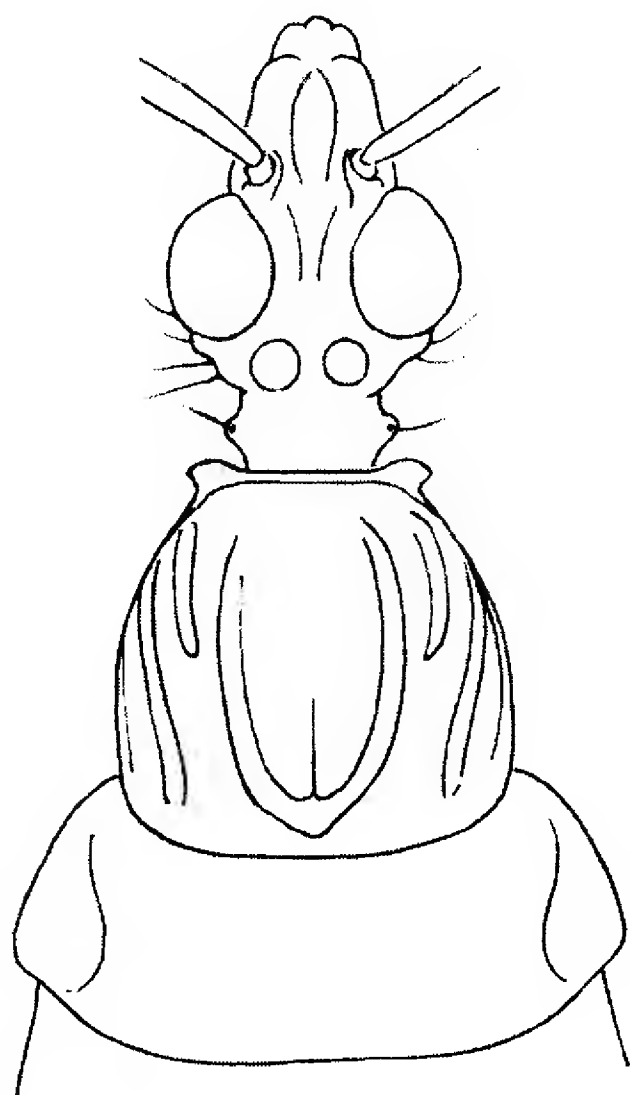


Figure 33. *Rasahus hamatus* (Fabricius). Forebody, dorsal aspect.

M. Roble (VMNH 1). **Middlesex Co.:** Nimcock Pond, 15 June 1994, W. C. Rothery (VMNH 1). **Northampton Co.:** Savage Neck Dunes Natural Area Preserve, Eastville, 9 July 2004, A. C. Chazal (VMNH 1). **Sussex Co.:** Chub Sandhill Natural Area Preserve, 6 June 2001, S. M. Roble & A. C. Chazal (VMNH 1). **City of Norfolk:** Virginia Truck Crops Experiment Station, June-August (VPISU 3, legit ?). **City of Richmond:** University of Richmond, 24 May 1936, C. C. Walton (VMNH 1). **City of Suffolk:** South Quay pine barrens, ca 10 km SSE of Franklin, Area 52, 24 October–6 December 2002, S. M. Roble (VMNH 1).

The few collection dates reflect a midsummer period of adult flight activity (May-August), with most records in June.

Genus *Sirthenea* Spinola

Large brightly colored bugs with eversible pads present on protibiae only, broadened and extending just short of halfway along ventral side of the podomere. Procoxae strongly incrassate, mesocoxae only moderately thickened.

Pronotum with five grooves, the median incomplete, lateral two grooves oblique, the inner shortened. Metapleural sclerites granular, not striate or ridged.

Maldonado listed 35 species in this genus, about half of them in the Neotropical Region, the others dispersed through Africa, Madagascar, Australia, and southeast Asia. Only one extends into North America, where it has apparently been successfully expanding its range in recent decades.

214. *Sirthenea stria carinata* (Fabricius) Figure 34, Map 29

A strikingly colored, large insect, males 20-22 mm in length, females 21-23, the largest specimen 24.5 mm. Body black, corium pink to orange-red, with inner basal margin and clavus piceous; legs yellow to light brown. Nymphs are generally similar to adults in structure, but differ in that the thorax is bright orange, the meso- and metafemora notably infuscated with brown. Anterior lobe of pronotum with seven grooves in a symmetrical pattern (Fig. 34).

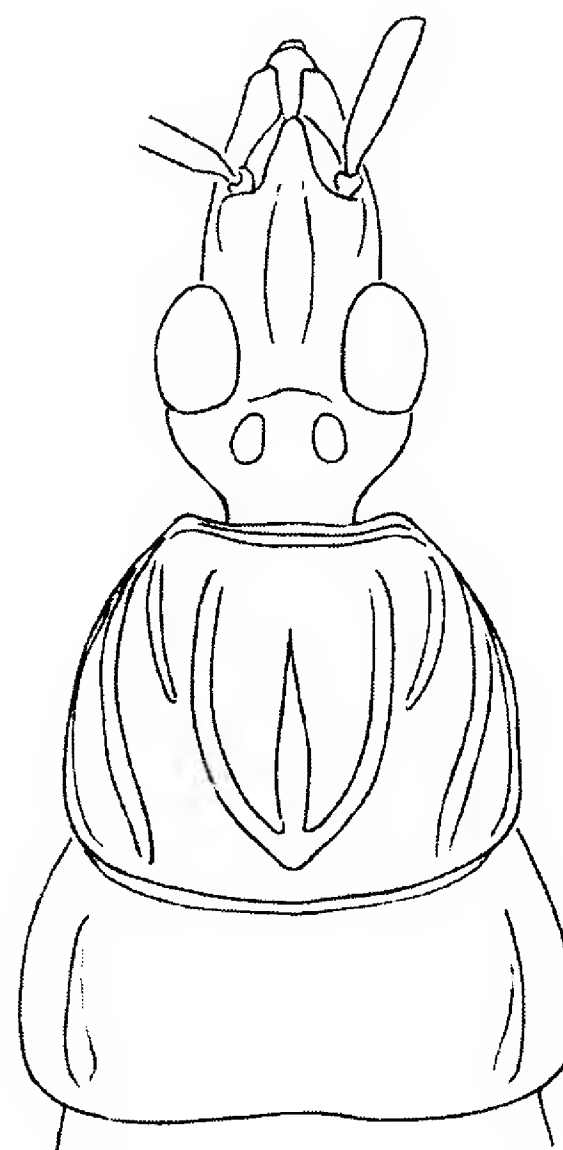


Figure 34. *Sirthenea stria carinata* (Fabricius). Forebody, dorsal aspect.

The species is widespread in eastern North America, New Jersey to Florida, west to Texas, north in the interior to Michigan and Ohio. The nominate subspecies *S. s. stria* extends southward to Brazil.

Most of our Virginia records are from Piedmont and Coastal Plain counties, but the capture in Washington County represents the northern lobe of the range in the Interior Lowlands. Accomack, Bedford, Brunswick, Chesterfield, Dinwiddie, Fairfax, Fluvanna, Greenville, Halifax, Henrico, James City, King George, Lancaster, Northumberland, Nottoway, Orange, Patrick, Prince Edward, Prince William, Stafford, Surry, Washington, and York counties, and the cities of Chesapeake, Hampton, Norfolk, Richmond, Suffolk, Virginia Beach. The Patrick County locality is at 1300 ft. near the north end of Bull Mountain, along a small swift rivulet, totally unlike the usual habitat of this species. Perhaps the specimen was an aeolian migrant.

Capture records for 61 adults reflect an early summer peak, with activity extended into November.

April	1
May	17
June	17
July	6
August	11
September	7
October	1
November	1

The earliest record is for 14 April. Two nymphs with wing pads (5th stadium?) taken on 12 October are 11 and 14.8 mm long. A similar individual, 14.2 mm long is dated 22 May, establishing overwintering in late nymphal instars and final moulting in May. It is possible that some adults may also overwinter, as also inferred by Hagerty & McPherson for southern Illinois.

It is noteworthy that Blatchley found only a single adult in Indiana and Florida, despite "scores of nymphs". I have never found a nymph in Virginia; our three VMNH specimens were taken in pitfall traps. Brimley (1938: 73) cited only three localities in North Carolina, but NCSU has the species from 11 additional places, all but one of them taken since 1938. The earliest collection date for Virginia material that I have seen is 1936; most are after 1970. While the use of black light (UV) trapping has greatly increased in the past two decades, the possibility of a dynamic northward dispersal in recent decades, as documented for various other "austral" insects, must also be considered as contributory.

Subfamily VII. ECTRICHODIINAE

This is one of the larger subfamilies, with 111 genera and 643 species listed by Maldonado. As usual the great majority are restricted to the tropical regions of both hemispheres; only two genera extend northward into the United States, one of which occurs to the east and north as far as Virginia.

The antennae consist of eight apparent articles, the 3rd being subdivided into two, and the 4th into four. In males the wings are usually full, in females often abbreviated, but in both sexes are narrow and expose the connexiva broadly on each side. The scutellum is apically bifid.

So many tropical ectrichodines are known to be obligatory predators on diplopods that this specialized way of life may be assumed general for the subfamily. To my knowledge, feeding behavior has not been studied in our local species (thus an obvious subject for an interesting research project). *Rhiginia cruciata* appears to be an inhabitant of soil and litter biotopes, thus conforming to the habitat preference known for tropical species.

Genus *Rhiginia* Stål

This genus is confined to the Western Hemisphere, where represented by 20 species. Two of these extend into the United States, and one is widespread in the eastern half of the country. These insects are often reddish or orange in color with black trim, and are easily distinguished by the apically bifurcate scutellum.

215. *Rhiginia cruciata* (Say) Figure 35, Map 30

The species varies in length from 12 to 16 mm, without evident sexual dimorphism in size. It is a colorful reddish (scarlet to pale orange) insect with the elytra, sides of thorax, two spots on the pronotum, and some or all of abdomen black; legs yellow with femoral apices dusky. Legs and body are uniformly smooth and shiny.

The range of this species is general over the southeastern third of the United States, from New Jersey and Indiana south to Florida and Texas, thence into Mexico. It is statewide in Virginia, and doubtless occurs in all counties. Capture localities are documented for Albemarle, Alleghany, Bath, Botetourt, Culpeper, Cumberland, Essex, Fairfax, Fluvanna, Halifax, Henrico, Henry, Greenville, James City, King & Queen, Lee, Mecklenburg, Montgomery, Northampton, Pittsylvania, Prince William, Roanoke, Rockbridge, Rockingham, Scott,

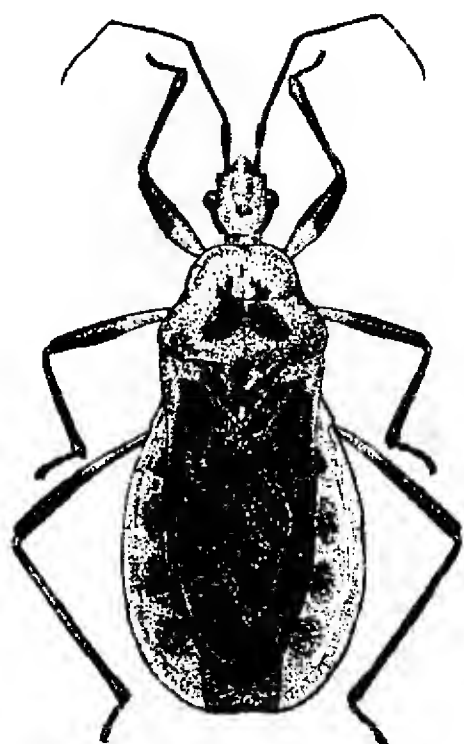


Figure 35. *Rhiginia cruciata* (Say). Drawing by Elsie H. Froeschner.

Shenandoah, Spotsylvania, Warren, Wythe, York counties, and the cities of Chesapeake, Norfolk, Suffolk, and Virginia Beach.

R. cruciata is clearly a diurnal predator; it is not attracted to light traps in Virginia, in contrast to the experience of J. C. Elkins, who wrote "Abundantly collected at electric lights through the summer along the Gulf Coast and in East Texas" (1951: 408). A major percentage of the 75 pinned specimens tabulated were collected in pitfall traps, but the figures given below would be far greater if captures made in Malaise traps by David R. Smith were included. A single trap operated during 4-14 May 1993 in Essex County took 23 specimens, and only a small start has been made in sorting the 200+ samples donated by Dr. Smith to VMNH. In my personal experience, specimens have been found often in leaf litter throughout the year, and on the wing in early May. They overwinter as adults.

A distribution by month of capture for 71 specimens gives a clear impression of late spring activity:

January	0
February	1
March	1
April	4
May	25 (+23)
June	21
July	8
August	4
September	3
October	3
November	0
December	1

An interesting peculiarity of this insect is that, at least in pinned specimens, the pigmentation of the legs (and especially the femora) is reduced to the point of transparency and it is usually possible to see the musculature and often the main tracheal trunks as well through the clear exoskeleton. Perhaps this reflects the evanescence of red pigments, as the same phenomenon may be noted also on the legs of *Sirthenea*.

Subfamily VIII. HAMMACERINAE

Large, robust reduviids with broad, truncate head, notably protuberant eyes, ocelli small, set between midlength of eyes; head inserted into thorax up to level of eyes; 2nd antennomere very slender, filiform, subdivided into a large number of false segments; thorax constricted at about midlength; entire surface of head and thorax densely tuberculate; scutellum broad, apically notched; elytra entire; sides of abdomen exposed beyond wings; protibiae with apical pads; femora of 1st and 2nd legs notably incrassate, each with two slender apicoventral processes.

With only two genera, this group is among the smallest subfamilies of the Reduviidae. Most of the 31 species are endemic to South America, five occur in the United States, and surprisingly few are recorded from Central America.

As *Hammacerus* is now considered to be a junior synonym of *Microtomus*, some authors have altered the subfamily name to Microtominae. Since Article 40(c) of the ICZN allows, in such cases, retention of the original family name if its type genus is found to be a subjective junior synonym and the replacement based on the older generic name has not gained "general acceptance", I follow the precedent of Blatchley, Maldonado, and Schuh & Slater in retaining Hammacerinae. There seems to be no consensus in favor of Microtominae in recent literature.

Genus *Microtomus* Illiger.

Our single representative of this genus embodies the characters cited above for the subfamily. It is the only member of a dominantly Neotropical genus that occurs as far north as eastern United States, although one other species occurs in southern Florida.

216. *Microtomus purcis* (Drury) Figures 36-37, Map 31

This large (to 27 mm) and conspicuous insect is instantly recognizable by the color pattern: mostly black with basal half of elytra dilute orange, and basal half of metafemora red. Abdomen black except for pale brownish

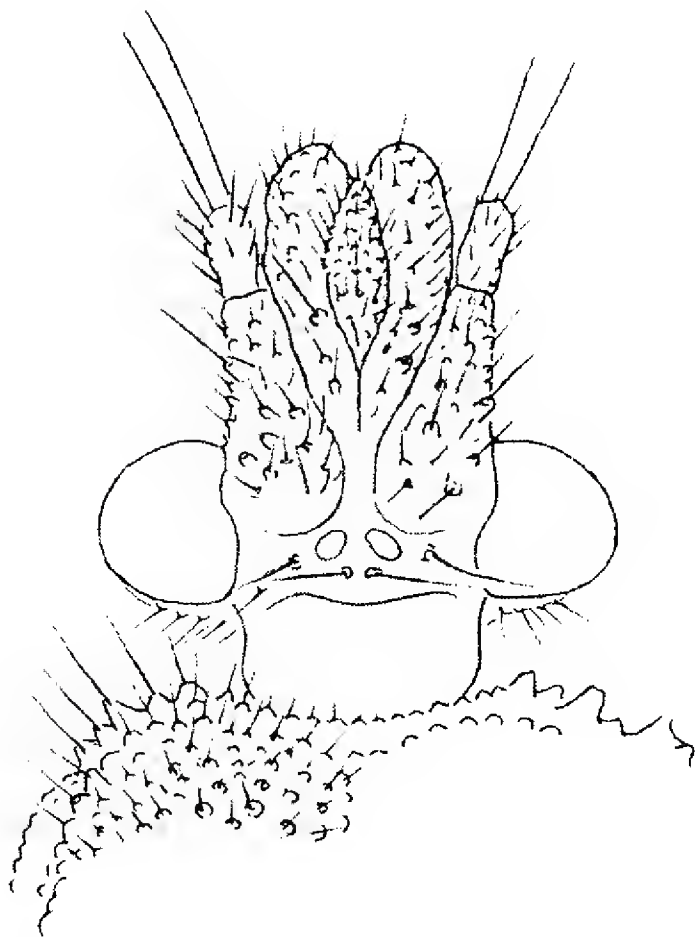


Figure 36. *Microtomus purcis* (Drury). Head, dorsal aspect.

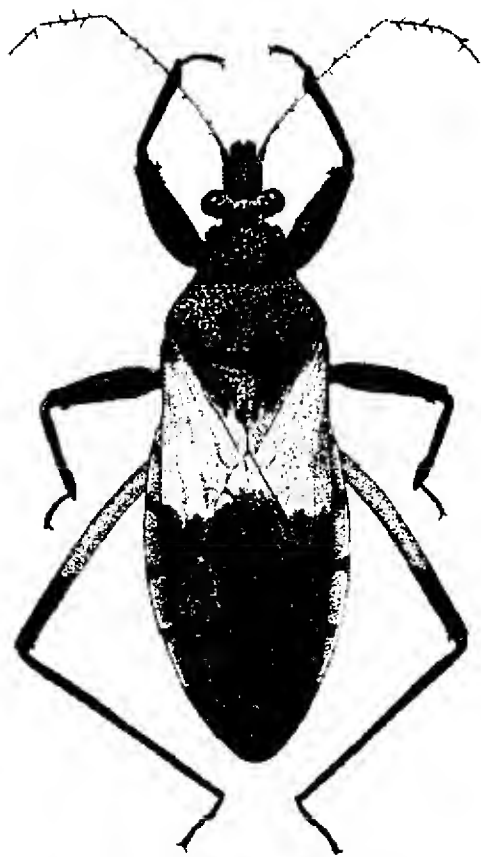


Figure 37. *Microtomus purcis* (Drury). Drawing by Elsie H. Froeschner.

midventral areas, connexiva red and black. Head and thorax densely beset with large, subconical tubercles, each bearing a stout, curved seta.

The range of *M. purcis* extends southward from Maryland to Florida, thence west to Texas, and north to Illinois and Indiana.

The species was originally described as *Cimex purcis* by Drury (1782), who based the name on material sent to him from Virginia. As he is known to have received insects from Dr. James Greenway, a planter in Dinwiddie County, it is likely that the original specimen(s) came from the same source. This county is therefore registered on Map 31, as the probable type locality. Subsequent collections have been extremely limited, however, and I have seen only three Virginia specimens: **Nottoway Co.:** without closer locality, in attic, 2 October 1994, legit? (VPISU 1). **City of Richmond:** without further data, 19 September 1927, G. W. Underhill (formerly in VPISU, now missing). **City of Virginia Beach:** Fort Story, 0.95 km SSE Cape Henry lighthouse, 24 August 1994, C. S. Hobson and D. A. Young (VMNH 1).

Specimens in the USNM establish the presence of this bug in central MARYLAND: **Charles Co.:** 13 August 1975 (11); 27 August 1975 (2), both G. B. Vogt. **Worchester Co.:** 10 km NW of Snow Hill, 16 August 1997, W. E. Steiner (1). **Prince Georges Co.:** Oxon Hill, 4 September 1972, collector not specified (1).

Available data document specimens found under loose bark, and attracted to lights. I have never collected this species, despite a half-century of removing bark and operating light traps, nor have these techniques been productive for other collectors in Virginia during the past decade. Yet Brimley (1907: 437) wrote that it was not uncommon at Raleigh, North Carolina and Elkins (1951) considered it to be common throughout Texas. Perhaps it is experiencing a declining status in the northern part of its range.

Subfamily IX. APIOMERINAE

Robust medium-sized reduviids. Ocelli widely separated on the short posterior lobe of head, immediately behind eyes; 2nd joint of rostrum as long as head length. 1st and 2nd pairs of legs incrassate and densely invested in setiform pubescence; tibiae with apical groove for accommodation of the retracted tarsi.

Treated as a subfamily by many authors (Blatchley, Maldonado, Froeschner, Miller, Villiers), this taxon was subordinated to tribal status under Harpactorinae by Davis (1969), followed by Schuh & Slater. As our local species

does not agree with the subfamily definition given by the last authors cited, or in many details with that proposed by Davis himself (1969: 92), I prefer to follow traditional usage as regards the hierarchic ranks of this group.

Genus *Apiomerus* Hahn

In this genus the 3rd segment of the rostrum is rudimentary, scarcely longer than its basal width; scutellum broadly truncate; front lobe of pronotum smaller than posterior, which is nearly hexagonal in dorsal view; abdomen invested in long silky grayish setae. Apex of tibiae with groove for retraction of tarsi. Genital capsule of males with a large, bifid process from the mesal margin (Fig. 38), unique among our local reduviid fauna.

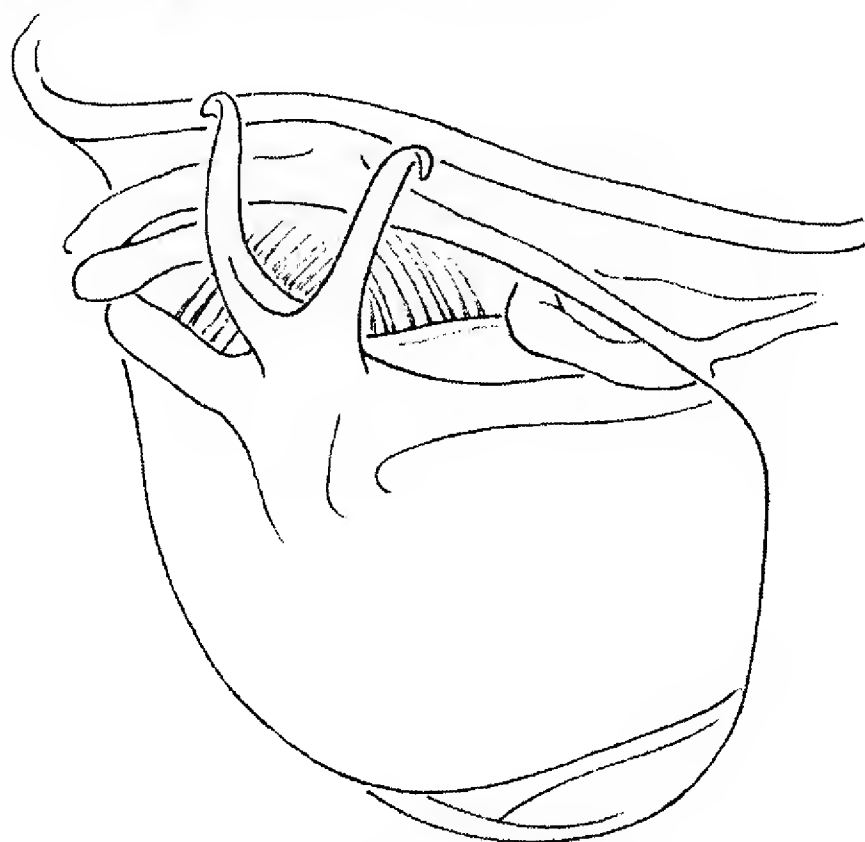


Figure 38. *Apiomeris crassipes* (Fabricius), hypopygium, caudolateral aspect.

Apiomerus is a large genus of about 107 species, the great majority of them endemic to South America. Nine species are recorded for the United States, of which only two occur in the east. One is common in Virginia, the other might possibly be found in the Southside region, if only as an occasional aeolian waif.

Key to species of *Apiomerus* of eastern United States

- Only margins of pronotum red; ventral side of abdomen black; length 14 or more mm.....*crassipes*, p. 35
- Majority of pronotal surface red; abdomen with transverse red bars ventrally; length less than 14 mm.....*spissipes*, p. 36

217. *Apiomerus crassipes crassipes* (Fabricius)

Figure 38-39, Map 32

A basically black insect, 14-16 mm in length, *A. crassipes* is notable for the elegant understated trim of vivid orange-red: dorsal margins of the thorax, dorsal and ventral edges of the abdomen, trochanters of the 1st legs, and a rounded spot on the sides just above the coxae of all legs. In some specimens, the red color is replaced by an orange-yellow.

The known range of *crassipes* is extensive: New England to Florida, west to southern California, north in the interior to Minnesota and Michigan. Another subspecies has been described from Mexico. The species is common in Virginia, documented from Albemarle, Alleghany, Appomattox, Augusta, Botetourt, Brunswick, Campbell, Charlotte, Craig, Culpeper, Dickenson, Fairfax, Frederick, Goochland, Henrico, Isle of Wight, James City, King & Queen, Lancaster, Loudoun, Lunenburg, Mecklenburg, Montgomery, Nelson, Nottoway, Page, Patrick, Pittsylvania, Roanoke, Rockingham, Shenandoah, Southampton, Spotsylvania, Sussex, and Warren counties and the cities of Chesapeake, Suffolk, Norfolk, Richmond, and Virginia Beach. None of the collecting sites is above 2000 ft. in elevation, and the impression is gained of an Upper Austral species making its way into the western mountains along the valleys of larger rivers. The absence of records west of the New River is probably only a reflection of inadequate collecting, as the far southwestern counties are inhabited by a number of "lowland" species.

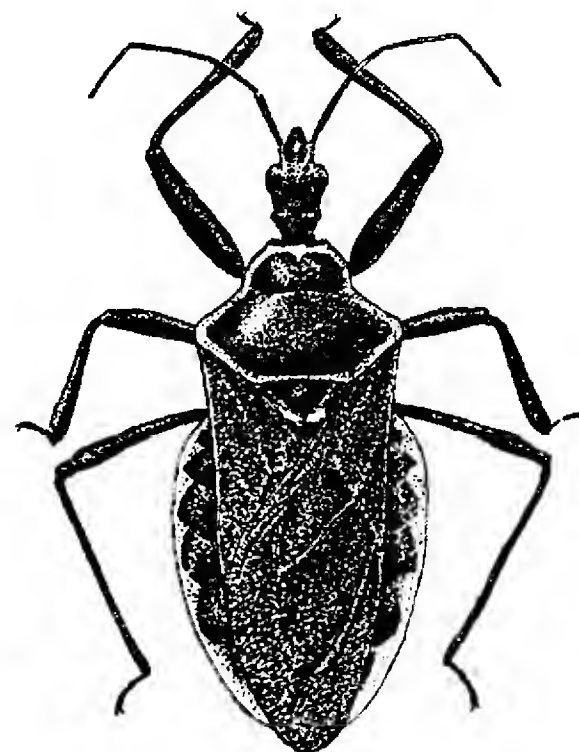


Figure 39. *Apiomeris crassipes* (Fabricius). Drawing by Elsie H. Froeschner.

The species is an opportunistic diurnal predator, usually found by sweeping and beating a wide variety of plants; it does not come to light, and only a few have been taken in pitfalls. To date, we have not recovered specimens from the extensive Malaise trap samples accumulated by Dr. D. R. Smith, suggesting minimal flight activity. Months of collection in the material at hand (50 specimens) show a decided midsummer activity peak, corresponding to the findings of Hagerty & McPherson in Illinois. Our single October specimen was taken in a pitfall trap. The species is said to overwinter in the late nymphal instars. Our smallest nymph (Sussex County) is about 7 mm long (?2nd stadium), having been collected in early August it could have attained maturity before the onset of cold weather. A somewhat larger nymph (9 mm, ? 3rd stadium) from Virginia Beach was collected on 5 July and would have been even more likely to reach maturity by September. It is a remarkable fact that in these very young insects, the "bottle-brush" protibiae are fully as thick as in the adults.

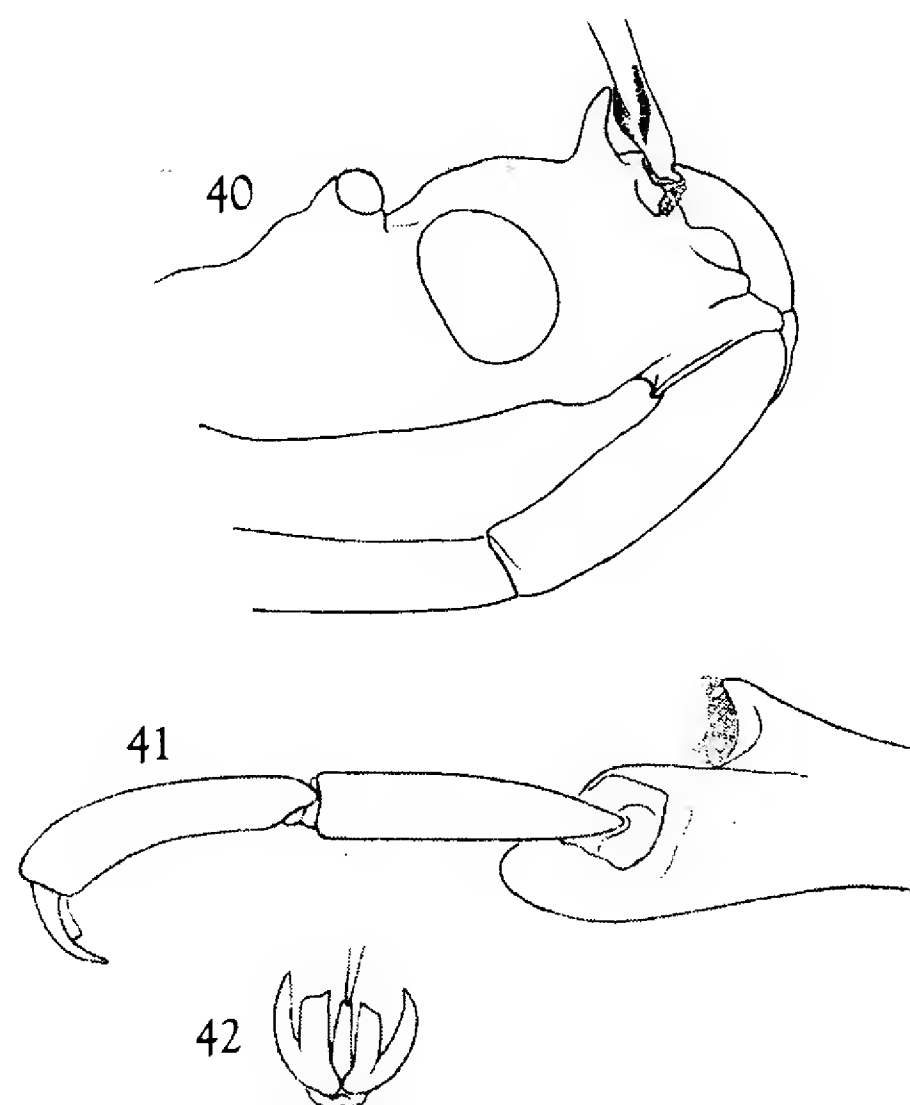
May	5
June	13
July	21
August	9
September	1
October	1

[*Apiomerus spissipes* (Say)]

A. spissipes has been recorded (Brimley, 1938) from Southern Pines, North Carolina, 97 miles south of the Virginia state line. I have seen no voucher material from that locality or elsewhere in North Carolina, so inclusion of the species as a possible member of the Virginia fauna is only very provisional. It should be easily recognized by the color characters mentioned in the foregoing key.

Subfamily X. HARPACTORINAE

Mostly medium sized to large reduviids, the local species tending to be arboreal, vagrant hunters with long legs. Profemora and tibiae slender in most genera (thickened and spinose only in *Sinea* and *Acholla*), postocular part of head usually long (except in *Pselliopus*) and cylindrical. In all of our genera the protibiae have an apical lobe (?antennal comb, Fig. 41), and the extremely long 1st antennomere is curiously bent and lobed at the base (Fig. 40). Tarsal claws are provided with very large foliate basal projections (Fig. 42), presumably enhancing purchase on plant surfaces. In males, the last abdominal tergite forms a flat roof over the genital capsule, and in the local genera, at



Figures 40-42. *Rocconota annulicornis* (Stål), structural details.
40. Front of head showing postantennal spine and modified base of antennomere I. 41. Distal end of tibia of foreleg, showing retracted basal tarsomere and presumed antennal cleaner.
42. Tarsal claws, showing large accessory laminae.

least, the parameres are basically very similar: long, slender, subclavate, and projecting beyond the dorsal edge of the capsule.

This group is by far the largest subfamily of reduviids, credited by Maldonado with 288 genera and just over 2000 species. Eight genera are represented in Virginia, with the likelihood of two others being found here.

The basal modification of the first antennomere, not mentioned by Davis (1969) or to my knowledge, any other author, is apparently associated with posture of these appendages. In life, the antennae are frequently carried back over - even closely applied to - the head and thorax. In the species with prominent postantennal spines the base of the antennomere is positioned *between* the spines, possible because of the curved offset (see Fig. 40). Even this accommodation seems not to be ideal, because it imposes considerable tension on the intersegmental membrane at the antennal socket. That the antennal modification is present even when the spines are not suggests that absence

or reduction of the latter is a secondary condition among these bugs.

An additional feature of antennal structure present in all of the Virginian genera of Harpactorinae is the sharp distinction between the basal two antennomeres, which are rigid and straight, with glabrous surface, and the 3rd and 4th, which are less sclerotized, flexible, and normally assume random curvatures, their surface appears dull owing to a dense vestiture of fine short pubescence.

Certain of our genera, namely *Zelus*, *Rocconota*, *Doldina*, *Fitchia*, *Repipta* and *Atrachelus*, are united by an interesting pronotal character: the front lobe is smooth and shiny, divided by surface grooves into one, two, or three pairs of paramedian convex areas, while the posterior part has a matte surface, finely but densely punctate-rugulose. In *Pselliopus* the entire dorsal surface of the pronotum is polished and impunctate. In *Sinea* and *Acholla* the posterior lobe is so deeply and coarsely punctate as to appear porose, while in *Arilus* the pronotum is not in any way comparable to either of the preceding modifications, enlarged and extending back over base of the abdomen.

Key to Virginia genera of Harpactorinae

1. Mesopleural sclerite with a small but distinct tubercle overlapping rear edge of propleuron (Fig. 54); head posterior to ocelli extended into a "neck" longer and narrower than the pre-ocellar part..... 2
- Mesopleuron without tubercle as described; head posterior to ocelli less modified as a neck region, not longer and more slender than the pre-ocellar region4
2. Front femora scarcely thickened and with only small tubercles on ventral surface; pronotum enlarged, extended over scutellum and base of abdomen, and produced into a high median crest bearing a row of elongated tubercles; large insects, length over 25 mm.....
-*Arilus*, p. 38
- Front femora greatly swollen, armed with numerous spines and coarse granules; pronotum not modified as in the preceding; smaller insects, less than 20 mm long.....3
3. Protibiae with long slender spines; profemora with a long erect subapical dorsal spine*Sinea*, p. 44
- Protibiae without spines; profemora without a long erect subapical spine *Acholla*, p. 37
4. Apical angles of abdominal segments 3-5 prolonged as acute projections (Fig. 44); 3rd antennomere of males broadened; adults less than 10 mm in length.....
-*Atrachelus*, p. 38
- Apical angles of abdominal segments square or acute, but not prolonged; antennae of males not modified; adults more than 10 mm long
-5

5. Legs and antennae conspicuously annulated with black rings; posterior lobe of pronotum convex, impunctate
- *Pselliopus*, p. 41
- Legs and antennae not annulated with black; posterior lobe of pronotum rugopunctate in strong contrast to the smooth, shiny, anterior lobe
-6
6. Basal segment of rostrum much shorter than 2nd.....
-*Zelus*, p. 46
- Basal segment of rostrum equal to or longer than 2nd...7
7. Hind lobe of pronotum with four long spines near posterior margin
-8
- Hind lobe of pronotum without long spines.....9
8. Antennae, legs, four bands on pronotum, and elytra black, body otherwise orange; postantennal spines longer than interocular space; length about 10 mm
-*Repipta*, p. 43
- Body uniformly light brown except orange abdominal dorsum; postantennal spines much shorter than interocular space; length 15-18 mm.....
- *Rocconota*, p. 39
9. Body elongated, linear; apex of femora armed on each side with a short slender spine (Fig. 46)
-*Doldina*, p. 39
- Body not linear, abdomen broadened; femora without apical spines.....
-*Fitchia*, p. 40

Genus *Acholla* Stål

This monotypic Nearctic genus appears to be closely related to *Sinea*, differing in the reduced armature of the profemora and entirely unspined protibiae (Fig. 51). In common with *Arilus* and *Sinea*, the mesosternum has a small but distinct tubercle adjoining the edge of the prosternum (occasionally overlapping on it); shared with *Sinea* and *Pselliopus* is the slight but evident subapical thickening of the femora, and the dense beading of the incrassate profemora with *Sinea*.

218. *Acholla multispinosa* (DeGeer) Figure 51, Map 33

Somewhat larger than the local species of *Sinea*, body length to about 15 mm, without pronounced sexual dimorphism. Color generally light brown, antennae somewhat reddish with vaguely indicated annuli, legs lighter brown with subapical femoral ring; elytral membrane piceous to black.. Profemora only moderately incrassate, generally parallel-sided, with a few small spines on distal half; protibiae long and slender, without spines (Fig. 51).

This species appears to occupy a distinctly northern range, from Maine to Colorado, south in the interior to Texas, in the east through the Appalachians to western North

Carolina. Virginia records are all in the mountainous parts of the state, in the counties of Augusta, Giles, Montgomery, Nelson, Rockbridge, and Washington. Collection dates by month reflect a late summer-Fall activity peak:

June	1
July	2
August	6
September	1
October	4
November	2

Blatchley stated that the species was "frequent throughout Indiana" with adult capture dates between mid-July and late October. Conversely, Hagerty & McPherson reported collection of only a few specimens in southern Illinois, reflecting the condition in Virginia.

Genus *Arilus* Burmeister

Large reduviids (adults 25-35 mm) characterized by elevation of the pronotum into a high median carina, armed with a row of digitiform tubercles, which extends far posteriad over the scutellum and wing bases. Males differ from those of our other local genera of Harpactorinae in that the median process of the genital capsule is broad and truncate instead of acutely triangular.

Maldonado recognized five species of this basically Neotropical genus, one of them extending into the United States where it is widespread and common.

219. *Arilus cristatus* (Linnaeus) Figure 43, Map 34

The Wheel Bug. A very large (Virginia females to 32 mm, males to 28 mm) and robust predatory insect, the *Tyrannosaurus rex* of our heteropterous fauna. The modification of the enlarged pronotal crest, with its row of 8-12 digitiform projections, allows for instant recognition. To the eye, the color is an almost uniform dark mousy gray overall, resulting from a vestiture of fine silky pubescence but with magnification the body appears light reddish-brown, with head nearly black, and the legs, antennae, and rostrum a clear orange-red. In young nymphs, the entire abdomen is crimson.

The distribution is extensive, from New York and southern Ontario west to Iowa, south to Florida and Texas, thence as far as Guatemala. In Virginia, it appears to be statewide at lower elevations, and I have seen specimens from Alleghany, Augusta, Bedford, Botetourt, Brunswick, Campbell, Caroline, Charles City, Cumberland, Floyd,

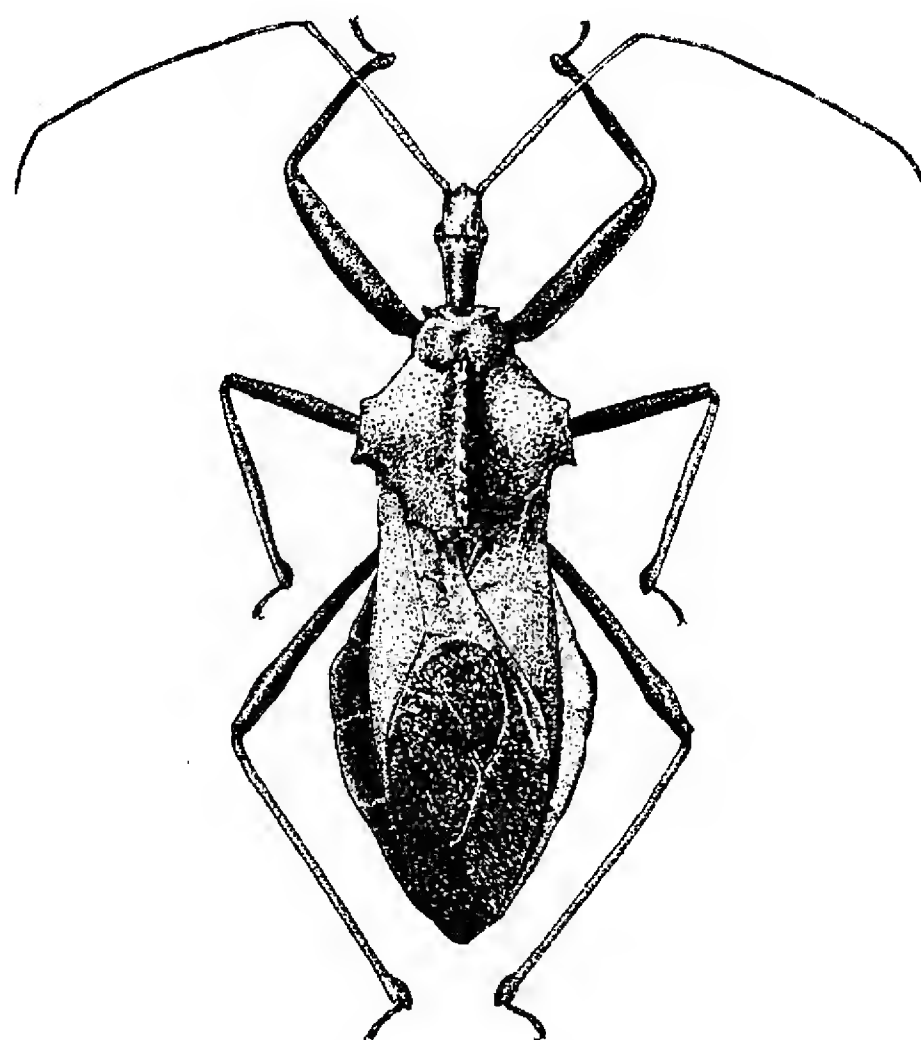


Figure 43. *Arilus cristatus* (Linnaeus). Drawing by Elsie H. Froeschner.

Frederick, Giles, Henry, James City, King & Queen, Lancaster, Loudoun, Louisa, Mecklenburg, Middlesex, Montgomery, Northampton, Nottoway, Pittsylvania, Powhatan, Prince Edward, Pulaski, Richmond, Roanoke, and Rockingham counties, and the cities of Chesapeake, Norfolk, Richmond, and Suffolk. None of the recorded capture sites are above 2500 ft in elevation.

Aside from a few specimens in late July and August, the great majority of adults at hand were taken in September and October, thus approximating the activity season noted by Hagerty & McPherson (1999) for southern Illinois.

Genus *Atrachelus* Amyot & Serville

This genus is a member of the group including *Zelus*, *Rocconota*, and *Repipta*, and characterized by four rather long slender pronotal spines, lateral ends of abdominal segments 3-5 produced into short acute spiniform projections (Fig. 44), 3rd antennomere of males broadened basally, and femora of 1st legs without spines.

As revised by Elkins (1954) this genus of small harpactorines contains ten species distributed from Argentina to eastern United States.

220. *Atrachelus cinereus cinereus* (Fabricius)

Figure 44, Map 35

One of our smallest reduviids (length 7-8 mm), *A. cinereus* is overall a sombre grayish-brown, the dorsal surface invested with a coating of fine gray pubescence; abdomen and legs dull yellow.

The range of this small bug is primarily subtropical: North Carolina south into the West Indies, west to Texas and Missouri, and eastern Mexico. A subspecies, *A. c. wygodzinskyi* Elkins, occurs in southwestern United States and northern Mexico. Published records for Pennsylvania and Michigan require verification.

Inclusion of this species in the Virginia fauna is a little uncertain. VMNH has a single damaged female from an unlabeled vial, thought to have been found in Vienna, Fairfax County, in November 1975. Since *cinereus* is known from nearly a dozen places in North Carolina, one of them (Raleigh) only 50 miles south of the state line, confirmation of the presence of the species in Virginia seems almost certain.

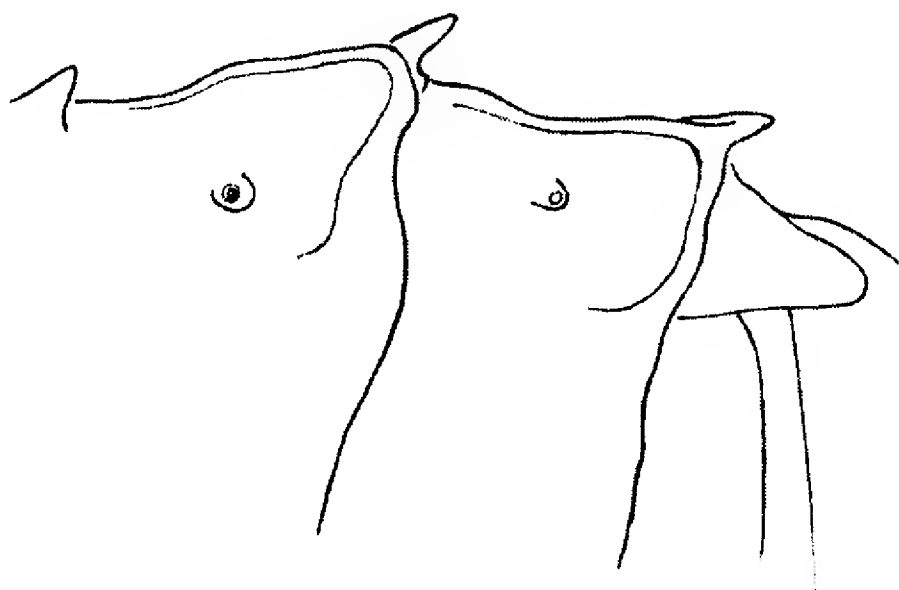


Figure 44. *Atrachelus cinereus* (Fabricius), Sides of two abdominal segments showing projected connexival corners, ventrolateral aspect.

[Genus *Doldina* Stål]

Appearing at first to be an attenuated version of *Zelus*, this genus is easily distinguished from it by the long basal joint of the rostrum, undifferentiated pronotum, and apical femoral spines (Fig. 46).

The latest revision of the genus (Hussey & Elkins, 1955) recognized seven species in this basically Neotropical genus, one of them represented in southeastern United States.

[*Doldina interjungens* (Bergroth)]

Figures 45-46

An elongate, slender insect, length to 19 mm; color generally yellowish to very light brown; abdomen often infuscated, head and femora sometimes reddish.

So far, we have no records for capture of this bug in Virginia. However, it was described from Roanoke Island, North Carolina, only 45 miles south of the state line, and Barber (1915) cited a specimen (now AMNH) taken by Nathan Banks at Bay Ridge, Anne Arundel Co., Maryland. So bracketed, there can be little doubt that *Doldina interjungens* occurs somewhere in Virginia. Perhaps extended collection work (or serendipity) at Back Bay or along the Chesapeake Bay littoral zone will result in locating an instate population. According to published information, the species occurs on dead grasses along the borders of ponds, lakes, etc., sedges back of the beach, grasses in or bordering salt marshes (often at night), sometimes at lighted sheet.

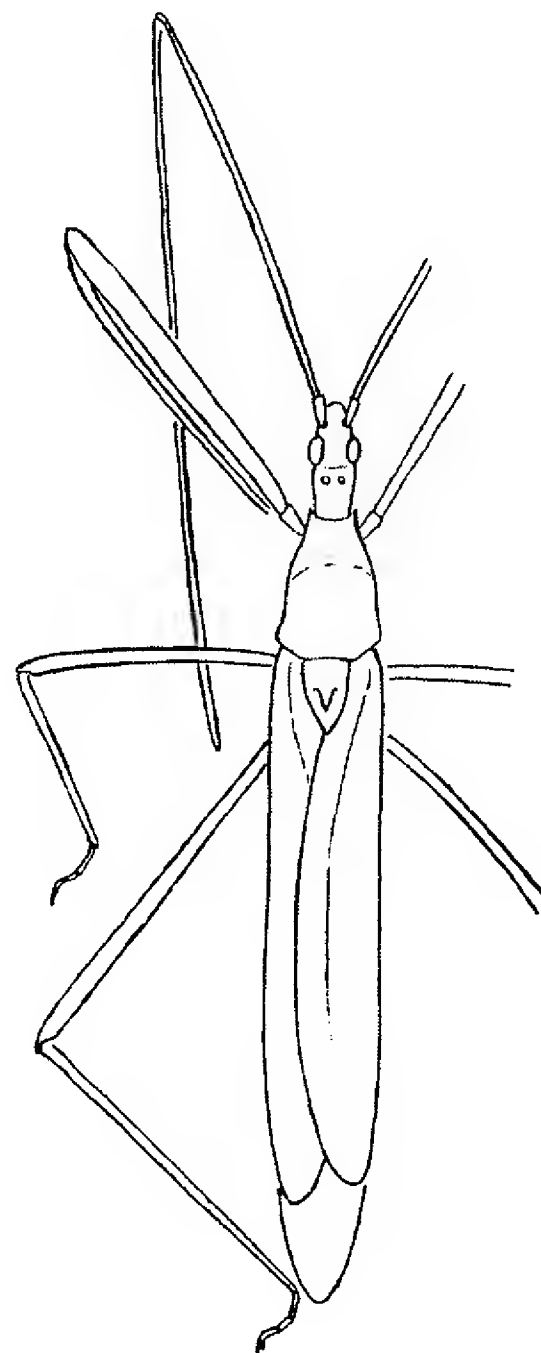


Figure 45. *Doldina interjungens* Bergroth.

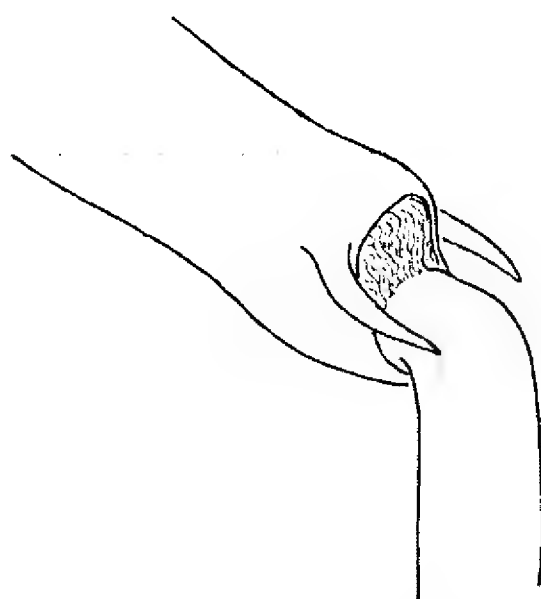


Figure 46. *Doldina interjungens* Bergroth, distal end of mesofemur showing spines characteristic of this genus.

Genus *Fitchia* Stål

Both species of this small genus are widely distributed in North America but the characters traditionally employed for their distinction (as stated, e.g., by Blatchley) were both subjective and variable, leading to an unsatisfactory perception of their actual ranges. A careful review of the genus by McPherson *et al.* (1992) yielded much better means for recognition, utilized in the following key. Those authors also noted a difference in the shape of the male parameres, but unfortunately in this genus the genital capsule is held closely against the preceeding segment and the parameres thus not visible. Relaxing a specimen for removal or displacement of the capsule may be necessary to resolve cases in which the spiracular color or pronotal spination is not conclusive.

Key to Virginia species of *Fitchia*

- Spiracular peritremata brown to black, contrasting with the yellowish abdominal sterna; posterior margin of pronotum usually without spines, but occasionally present as two small paramedian projections *aptera*, p. 40
- Spiracular peritremata not darkened, more or less concolorous with abdominal sterna; posterior margin of pronotum usually with humeral and paramedian spines (Fig. 47)..... *spinosula*, p. 40

221. *Fitchia aptera* Stål Map 36

Length 11-12 mm., no evident sexual dimorphism in size. Adults occur in both fully winged and wingless conditions, the latter by far the most common. Color

uniformly straw-yellow to a pale orange, the abdomen dorsally with a broad black median band, ventrally with a narrow median black band and two much broader dorsolaterals. Prothorax usually with a dark band at level of eyes, and front lobe often darker than posterior. Adult males differ from those of *spinosula* in that the parameres are slender and cylindric, against their apically clavate form in *spinosula*.

The distribution of the species is a wide one, virtually all of eastern North America as far west of Colorado (McPherson *et al.*, 1992, Fig. 2A). Although apparently not previously known from Virginia, *aptera* appears to be statewide at low to moderate elevations. Specimens have been seen from: **Alleghany Co.:** along the CSX railroad, 8 km east of Clifton Forge, 22 August 1984 (VMNH 1). **Cumberland Co.:** 2-5.5 km southwest of Columbia, 2 April, 1 May, 16 September 1990 (VMNH 4). **Pulaski Co.:** Dublin, 14 April, 22 April 1998 (VMNH 2). **Roanoke Co.:** without further location, 11 May 1974 (VPISU 1). **City of Richmond:** University of Richmond campus, 19 August 1946 (VMNH 1). **City of Norfolk:** Virginia Truck Crops Experiment Station, 22 September 1933, 4 June 1970 (VPISU 2). **City of Virginia Beach:** without further locality, 6 April 1971, legit? (VPISU 1)

In addition to the foregoing, numerous localities in the shale barren habitats of Bath, Highland, Rockbridge, Rockingham, and Shenandoah counties were cited by Wheeler (2000), with field observations on seasonality and immature stages. He found overwintered adults in May, 1st instar nymphs in late June, and no individuals at all in September and October, suggesting a late-season, univoltine life cycle at least in that specific habitat. The few specimens from elsewhere in Virginia at hand generally support Wheeler's observations, with the qualification that in lower and warmer Piedmont Virginia (Cumberland Co.) adults have been found as early as 2 April and as late as 16 September. Our specimen from Alleghany County was found under a scrap of wood, in a shale barren habitat. Only one of the nine VMNH specimens is winged.

The species apparently is not attracted to UV light.

222. *Fitchia spinosula* Stål Figure 47, Map 37

Generally very similar to the preceeding species in size, color, and structure, but more often with two humeral and two paramedian spines on posterior pronotal margin. Stigmata nearly concolorous with abdominal sterna. Parameres of male distinctly clavate distally.

This species is even more widely distributed than *F. aptera*, recorded for Washington State (McPherson *et al.*,

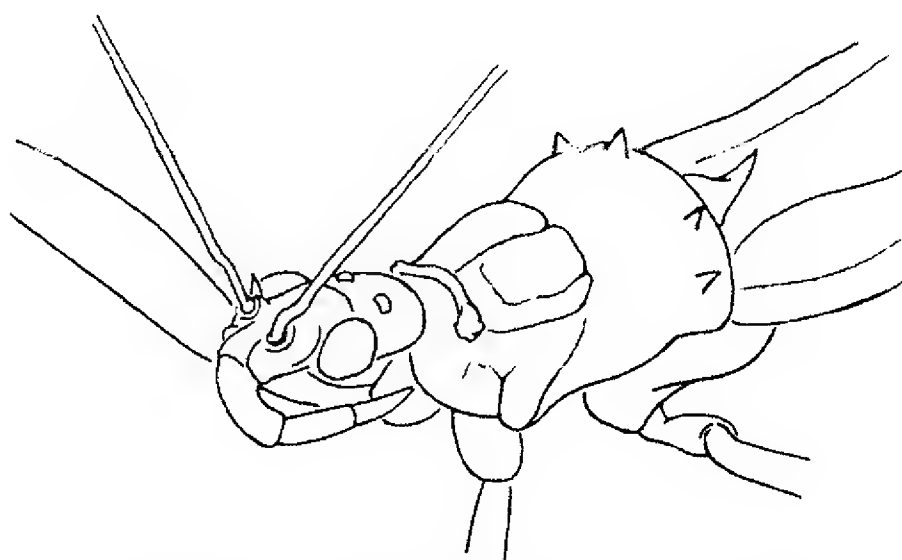


Figure 47. *Fitchia spinosula* Stål, forebody, anterolateral aspect to show thoracic spines.

1992, Fig. 2B). It is known from Pennsylvania and North Carolina, but no records have been published for Virginia. I have examined only two specimens from this state: **City of Virginia Beach:** Cape Henry, 10 September 1935 (VPISU 1); "Virginia Beach" [the resort area], 10 May 1970 (VPISU 1). The Cape Henry specimen had been identified by H. G. Barber as an undescribed species, but it agrees with the characters specified by McPherson et al. for *spinosula*.

Genus *Pselliopus* Bergroth

Legs and antennae boldly annulate in black and white; entire dorsal surface of pronotum typically smooth, polished, impunctate (*latifasciatus* is exceptional), posterior lobe convex. Both sexes are fully winged as adults. In all of the Virginia material examined, females of both *barberi* and *cinctus* typically have two paramedian rows of large black streaks on the abdominal venter. Meso- and metafemora with a fairly distinct subterminal enlargement at the 2nd annulus.

Pselliopus is a genus of colorfully marked animals, its 17 species largely confined to the New World tropics. Six extend into the United States, three of them as far as Virginia.

Fresh or clean specimens often show prominent white streaks on each side of the scutellum, and white dots on the outer sides of the abdominal sterna and thoracic pleura. Examination with high magnification shows that the white color is actually a form of secretion, varying from very fine "pubescence" to fairly long, dense flocculence that can be removed with a fine needle. I have seen nothing comparable in other harpactorines and have no insights concerning its origin and function.

The two common local species are of interest for their seasonal distribution, overwintering as adults often in large aggregations, mating in the spring, and present during

midsummer only in the nymphal stages (Radio, 1927, Froeschner, 1944, Hagerty & McPherson, 1999). Curiously, despite a lifetime of bark removal throughout Virginia, I have never found a hibernating individual, to say nothing of an aggregation. My only cold weather finds for any *Pselliopus* have been of a few individuals in deep leaf litter.

Key to the Virginia species of *Pselliopus*

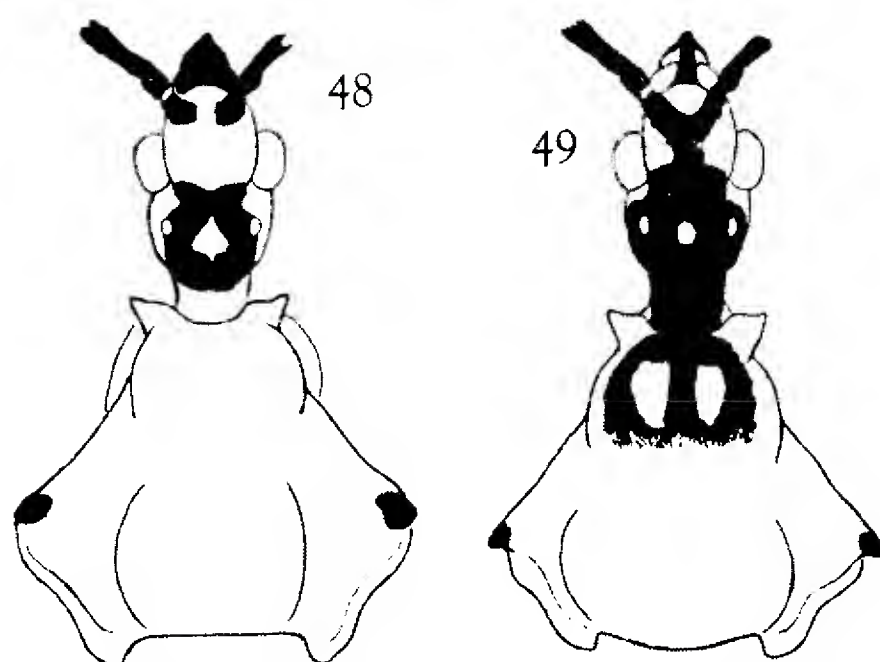
1. Front lobe of pronotum setose, beset with 10-12 prominent tubercles, rear lobe with numerous smaller tubercles or large granules; humeral projection not pigmented; head with two low conical tubercles between the eyes *latifasciatus*, p. 43
- Entire dorsal surface of pronotum smooth and glabrous; humeral projection black; top of head smooth, no paramedian interocular tubercles 2
2. Humeral spine longer, directed caudolaterad (Fig. 49); color dull yellowish; top of head with V-shaped mark extending back from antennal tubercles; front lobe of pronotum usually black; apical half of male parameres black *cinctus*, p. 42
- Humeral spine shorter, directed laterad (Fig. 48); color bright orange; top of head without V-shaped black marking; front lobe of pronotum not black; male parameres uniformly yellow or dark only at apex *barberi*, p. 41

223. *Pselliopus barberi* Davis

Figure 48, Map 38

A moderate-sized, colorful reduviid, the great majority of nearly 70 specimens measuring almost exactly 11 mm in length, one or two as small as 10 mm. There is no sexual dimorphism in size. Body bright orange, posterior lobe of head with a black mark enclosing an orange interocellar dot; no black V-shaped mark extending back from the antennal tubercles; "neck" region of head orange. 1st antennomere with three broad black annuli, 2nd with two, 3rd and 4th unmarked; femora with five narrow black rings, tibiae with four, of which the fourth is much broader than the others; abdominal segments with an elongated triangular black mark on each side, both dorsal and ventral. Rear margin of pronotum straight in front of scutellum, the latter without apical white spot.

The species is apparently statewide in Virginia at lower elevations, the lack of records for the far southwestern counties is surely only a collecting bias. Accomack, Alleghany, Augusta, Brunswick, Craig, Essex, Fairfax, Henrico, Henry, Gloucester, James City, King & Queen, King William, Mecklenburg, Montgomery, Nelson, Patrick, Prince



Figures 48, 49. Forebodies of two species of *Pselliopus*. Color pattern somewhat diagrammatic. 48. *P. barberi* Davis. 49. *P. cinctus* (Fabricius).

Edward, Roanoke, Shenandoah, Southampton, Sussex and York counties, and the cities of Richmond and Suffolk.

The species appears to be common around Richmond, represented in considerable numbers in student collections made at the University of Richmond. It is generally collected by sweeping weedy fields and roadsides, almost never in pitfall traps or at UV lights.

Seasonal collection data from about 70 VMNH specimens sort out as follows:

March	5
April	8
May	3
June	2
July	1
August	5
September	6
October	17
November	9

C. S. Brimley, quoted by Blatchley (1926: 575) stated that "Mr. Sherman took over 100 specimens under the bark of a dead pine near here [Raleigh, N.C.] on Oct. 29, 1900, and we have not seen one since." Cause and effect?

224. *Pselliopus cinctus* (Fabricius)

Figure 49, Map 39

Body length 10-12 mm, most specimens clustering around 11 mm, no evident sexual dimorphism in size.

Generally similar to the preceding species, but basic ground color yellow instead of orange, and hemelytral membrane amber instead of transparent; black markings usually present on pronotum. Posterior edge of pronotum slightly convex in front of scutellum. Top of head with two black lines converging posteriad from antennal tubercles forming a V marking the apex of which usually contacts the black transverse postocular band; base of head (neck) black. Scutellum dark across base, apical half white.

The species' range is general over eastern United States, from Massachusetts west to Wyoming, and south to Texas and Florida. *P. cinctus* is statewide in Virginia, but no specimens have been seen from sites above 3000 ft. Albemarle, Alleghany, Augusta, Botetourt, Caroline, Chesterfield, Dickenson, Dinwiddie, Essex, Franklin, Halifax, Henrico, Henry, Isle of Wight, King & Queen, Lee, Mecklenburg, Montgomery, New Kent, Nottoway, Northampton, Pittsylvania, Prince Edward, Roanoke, Wythe, and York counties, also the cities of Chesapeake, Norfolk, Richmond, Suffolk, and Virginia Beach

The species is typically collected by sweeping or beating, particularly in open weedy fields with an abundance of composites and umbellifers. There seems to be no particular preference for any plant community, however. Adults overwinter, often congregating in considerable numbers prior to hibernation in the Fall. Mating occurs after spring emergence, the adults then perish and only nymphal stages are to be found during midsummer. Collection data for adults, by month:

March	4
April	5
May	7
June	5
July	1
August	7
September	13
October	18
November	2

The foregoing description of coloration is as seen with low magnification. With the eye, at about 10-12 inches distance, the animals appear a dingy pale brown, but the white tip of the scutellum is clearly visible. Under the same conditions, specimens of *davisi* appear uniformly orange, without a scutellar spot. The virtually transparent hemelytral membrane in that species allows the orange abdominal terga to show through; in *cinctus*, the membrane is amber and masks the abdominal coloration.

225. *Pselliopus latifasciatus* Barber
Map 40

Generally similar to the preceding species in size and color, but easily distinguished by the tuberculate dorsal surface of the pronotum and pair of low conical tubercles between the eyes. The protibiae have three narrow annulations on the basal third, the distal half with an elongated black line on each side. The humeral projection of the pronotum is longer than in either of the other species, and is not pigmented. The single male specimen at hand is 10.5 mm long.

Widely distributed in North America, from Maryland to Florida, west to Texas, north to Colorado and Michigan, the species appears to be nowhere common. One of the paratypes (USNM) was collected at Chain Bridge, Arlington County. Specimens examined from Alleghany Co.: Clifton Forge, 2 June 1950 (VPISU, lost). Augusta Co: George Washington National Forest, ca 8 km west of Stokesville, 15 October 1988, pitfall, Barry Flamm (VMNH 1). Nelson Co.: [without precise locality but doubtless from vicinity of Wingina], 26 June 1924, W. Robinson (USNM 1).

In general appearance and coloration, this species seems more similar to *cinctus* than to *barberi*. Its scarcity in collections is curious considering the pervasive abundance of the other two local species.

[Genus *Repipta* Stål]

A dominantly Neotropical genus of about 18 species, *Repipta* is represented in the United States by two species one of which extends as far northeast as North Carolina and may eventually be discovered in Virginia. Structurally these bugs resemble *Rocconota* but differ in smaller size, more pronounced constriction of the head into a "neck" and dark color of the elytra.

[*Repipta taurus* (Fabricius)]
Figure 50

Readily identifiable by the prominent pronotal spines and harlequin coloration of black and red, this small (11-13 mm) zeline has not been collected in Virginia, but may eventually be discovered in the southeastern counties.

The historical record for Pennsylvania appears to rest solely on the ambiguous "Pa." cited by Amyot & Serville as the type locality for their species *Zelus lineatus*, a junior synonym of *taurus*. Lacking more recent verification, this locality – in the light of current knowledge – must be considered as based on spurious locality data.



Figure 50. *Repipta taurus* (Fabr.) (specimen from North Carolina).

More reliable records define a range from Florida west and south to Panama, and northward in the United States to Illinois and Colorado. But even the Illinois record may be incorrect, since *taurus* is not among the species listed for the southern part of that state by Hagerty & McPherson (1999), nor was it documented for adjacent Missouri by Froeschner (1944).

Although *taurus* was not listed for North Carolina by Brimley (1938), I can now add that state to those known to be inhabited by the species. The NCSU collection contains a single specimen taken at Bladen Lakes State Forest, Bladen County, 10 September 1988. This northernmost confirmed locality is about 135 miles from the Virginia state line and opens the possibility that *taurus* may eventually be found here.

Genus *Rocconota* Stål

A small genus of 11 known species, all endemic to tropical America, with one extending as far north as the Great Lakes region and New Jersey. Our species superficially resembles a large species of *Zelus*, but is easily distinguished

by the more incrassate profemora, four prominent prothoracic spines, presence of large post-antennal spines, and especially the form of the rostrum in which the 1st and 2nd segments are subequal in length.

226. *Rocconota annulicornis* (Stål)
Map 41

Adult body length ranges from 17 to 18.5 mm in Virginia material (Blatchley cited 16-20 mm), females tending to be distinctly larger than males. Color light brown, the legs more yellowish, femora with dusky apical annulation. Dorsum of the abdomen is bright reddish-orange, perhaps of aposematic function. The large size, very long slender antennae, and prominent prothoracic spines render *annulicornis* easily recognizable.

The species was originally based on specimens from Texas and Mexico. Subsequently it was reported from New Jersey and elsewhere in the Atlantic coastal plain, and recently from southern Illinois (Hagerty & McPherson, 1999), outlining a Lower Austral distribution. It had not been recorded from Florida prior to Blatchley's report in 1926, and Brimley (1938) cited only two localities for North Carolina. By 1926, only a handful of specimens of this big insect had been documented, suggesting some degree of rarity.

In our experience, however, *annulicornis* is not rare in Virginia, extending inland as far as the Blue Ridge, and entering the southwestern part of the state as well. Specimens are at hand from Appomattox, Campbell, Chesterfield, Dickenson, Essex, Fairfax, Isle of Wight, King & Queen, Louisa, Nottoway, Pittsylvania, Prince Edward, Prince William, Roanoke, Smyth, Wise, and York counties, and the cities of Norfolk and Suffolk. The presence of the species in Dickenson, Smyth, and Wise counties assures that it must be statewide in both Tennessee and Kentucky, and it has been reported from Indiana and Illinois although not yet to my knowledge from well-collected Missouri.

VMNH has seven specimens from D. R. Smith's malaise traps in Essex County, although only a start has been made in sorting the material from those very extensive samples. The species is, exceptionally for a zeline, attracted to lights, both UV and incandescent, and we have several taken in pitfall traps. The recent enhancement of our knowledge of its range strongly suggests that *annulicornis* has been actively spreading northward in recent decades, as it seems unlikely that it could have been overlooked, for instance, in Indiana by such an experienced collector as W. S. Blatchley.

Collection records reflect a distinct midsummer activity period: 14 taken in July, five in August, two each in September and October, and one each in April and June.

A striking disparity in sex ratio is evident in VMNH material: only three of 21 specimens are males!

Genus *Sinea* Amyot & Serville

Medium-sized harpactophorines in which the profemora are incrassate and provided with two ventrolateral rows of long sharp spines and a longer acicular subapical spine on the dorsal side; protibiae as long as femora, and likewise provided with two series of spines which, when the two podomeres are opposed, alternate with those of the profemora and produce an interdigitating effect. Surface of profemora ornamented with dispersed bead-like tubercles. Posterior lobe of pronotum densely punctate, the impressions in close contact and producing a distinctly "honeycomb" effect unique in our reduviid fauna.

The modifications of the 1st legs in this genus merit comment. In addition to the large spines, their surface is densely studded with small beadlike tubercles, each provided with a silky hair as long as the diameter of the podomere. The tendency for enlargement of the profemora culminates in *spinipes* (Fig. 53) where thick and clumsy-looking. The profemur in *diadema* is distinctly less incrassate, with shorter hairs, and in this respect is more similar to that of *Acholla multispinosa* than *spinipes*. The protibiae in both the local species of *Sinea* are armed with long sharp spines analogous to the condition seen in *Pniroctis* (cf. Figs. 23 and 52); does this similarity in form imply some comparable prey-capture strategy in two unrelated taxa? Is it to be inferred that *Acholla*, lacking tibial spines, operates in a different way? Experiments with captive specimens should be easy to conduct.

In this genus, as in several others (e.g., *Oncocephalus*) the legs of the first pair are proportionately much larger in the immature stadia than in adults, and this is taken to an extreme in *Sinea spinipes*, the nymphs of which are bizarre little creatures with enormously enlarged first legs.

Sinea rileyi Montandon is discounted as a possible member of the Virginia fauna despite an early reference to "N.C." in the Van Duzee catalog, repeated by Brimley (1938), which I have been unable to trace. There are no specimens from that state in the NCSU collection, and only from Georgia in UGA. Since the confirmed range of the species is from Florida to California, the reliability of the record seems dubious at best.

The NCSU collection contains a single specimen labeled "Wake Co. N.C." identified by R. F. Hussey as *S. sanguisuga* Stål. I am unable to separate this specimen from *spinipes* by the traditional characters of coloration and head spines, and must exclude *sanguisuga* from the list of potential Virginia insects as it is not otherwise documented from farther north than Florida.

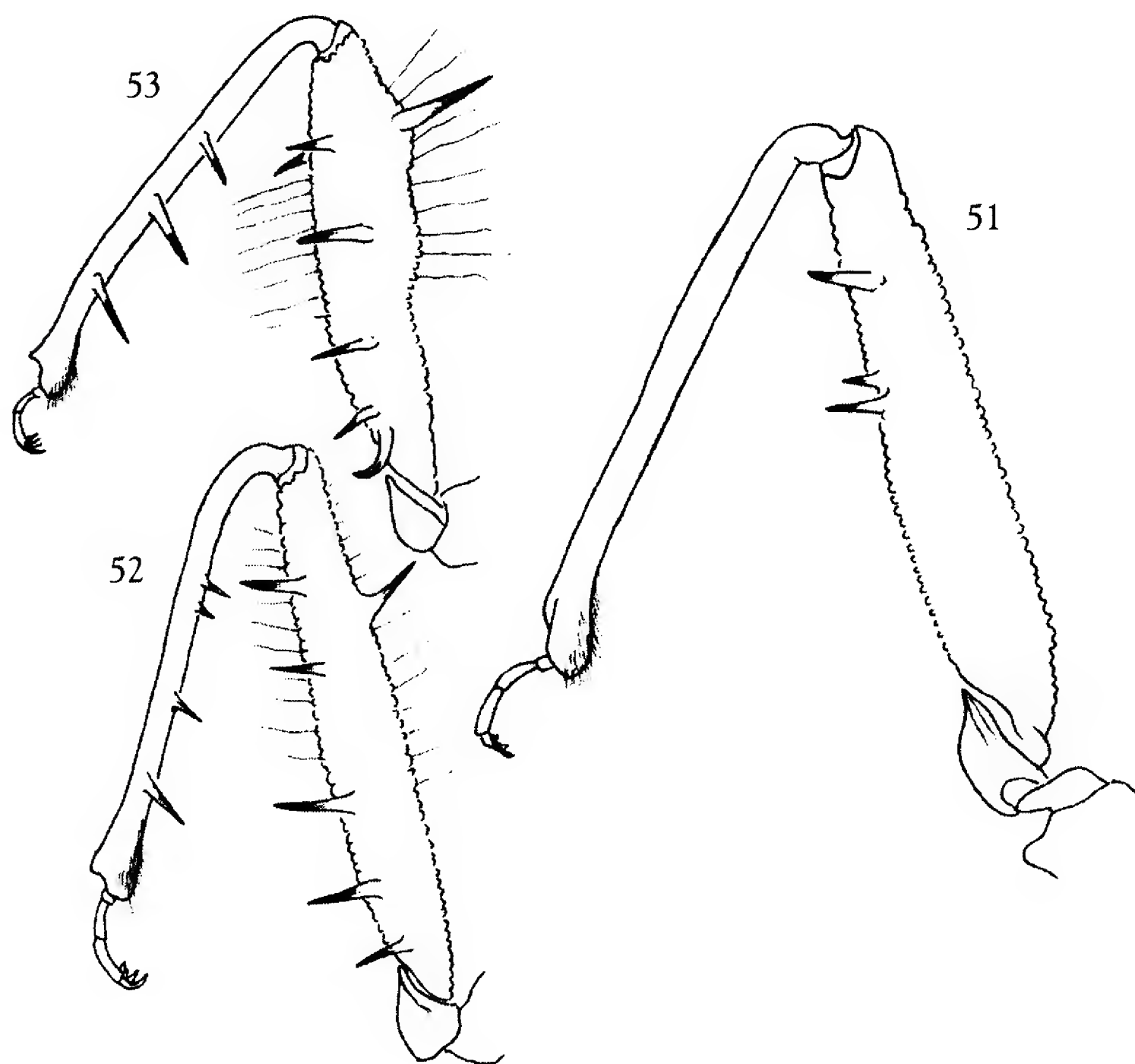
Key to the Virginia species of *Sinea*

- Front lobe of pronotum armed with numerous acute slender spines; interocular groove with a broad light colored transverse band between the eyes
*diadema*, p. 45
- Front lobe of pronotum ornamented with short, apically rounded tubercles; light area in the interocular groove reduced to two small paramedian dots, or absent
*spinipes*, p. 45

227. *Sinea diadema* (Fabricius)

Figures 52, 54, Map 42

A moderate-sized harpactophorid, body length in Virginia specimens ranging from 11 to 15 mm, females averaging about 2 mm longer than males. Coloration variable, from grayish to medium brown, with top of head, front lobe of pronotum, scutellum, meso- and metasterna, and often profemora much darker brown to piceous. Legs light brown to yellow. Tuberculation of femora white, ivory or light yellow. Hemelytral membrane shiny reddish-brown. Lateral ends of abdominal segments often nearly black.



Figures 51-53. First legs of three harpactorine species. 51. *Acholla multispinosa* (DeGeer). 52. *Sinea diadema* (Fabricius). 53. *Sinea spinipes* (Say).

The species is apparently statewide in Virginia, although we have no records from above 2000 feet. Accomack, Alleghany, Arlington, Fairfax, Hanover, Mecklenburg, Montgomery, Nelson, Northampton, Pittsylvania, Prince George, Roanoke, Smyth, and Wise counties, and the cities of Norfolk, Suffolk, Richmond, and Virginia Beach. Adult captures by month suggest a possible spring-fall bimodality. With far greater numbers (172 adults) Hagerty & McPherson found similar peaks in June and October in southern Illinois.

June	9
July	6
August	-
September	3
October	12
November	2

The transverse light interocular band seems not to have been mentioned in the literature. While it is not as conspicuous as the characters of pronotum and profemora, it nonetheless serves to distinguish all of the Virginia material of *Sinea* at hand.



Figure 54. *Sinea diadema* (Fabricius), thorax and leg bases, lateral aspect, showing enlarged tubercle (arrow) diagnostic of *Sinea* and *Arilus*.

228. *Sinea spinipes* (Herrich-Schaeffer)
Figure 53, Map 43

Very similar to the preceeding in body size and structure but slightly smaller, Virginia specimens ranging from about 10 to 14 mm, again males smaller than females by about 1 mm. Coloration generally similar but profemora generally much lighter, often entirely yellow.

Probably occurs in every county in Virginia at lower elevations. Accomack, Alleghany, Appomattox, Arlington, Augusta, Botetourt, Chesterfield, Clarke, Dickenson, Giles, Grayson, Greenville, Fairfax, Franklin, Frederick,

Henry, Isle of Wight, Mecklenburg, Montgomery, Nelson, Northampton, Patrick, Pittsylvania, Prince Edward, Roanoke, Wythe, and York counties, and the cities of Richmond, Suffolk, and Virginia Beach. By comparison with *diadema*, this species appears to be active (as adults) a little earlier in the year, although there is a similar midsummer lapse and fall peak in October.

March	2
April	3
May	15
June	11
July	-
August	6
September	7
October	10

VMNH has a 3rd instar nymph collected on 8 August, and a 4th instar on 6 September. These would have formed part of the adult October peak.

Like *diadema*, this species is a diurnal general predator and most frequently collected by sweeping weedy fields having an abundance of composites.

Genus *Zelus* Fabricius

Moderate-sized reduviids, the body and legs long and slender, and 1st antennomere as long as head and pronotum combined. Postantennal spine absent. Posterior lobe of pronotum notably broader than anterior, its posterior edges marginate. Basal joint of rostrum much shorter than 2nd.

Zelus is another genus confined to the New World, with the great majority of its 59 species occurring in South America. The nine Nearctic species were revised by Hart (1986), who imposed a number of name changes affecting our local fauna as detailed under the relevant species accounts.

Key to the Virginia species of *Zelus*

1. Pronotum without spines 2
- Pronotum with two or more spines 3
2. Body orange, legs, antennae, basal half of elytra, and membrane black *longipes*, p. 47
- Color generally overall light brown, legs clear yellow with brown dots *cervicalis*, p. 47
3. Only the humeral angles of pronotum with laterally directed acute black spines *luridus*, p. 47
- Posterior margin of pronotum with two conical paramedian spines or tubercles in addition to the humeral spines *tetracanthus*, p. 48

229. *Zelus cervicalis* Stål
Map 44

This species is generally similar to others of the genus in structure and coloration, but is distinct in lacking humeral pronotal spines. The legs are uniformly pale yellow, sparsely speckled with small brown spots, apical dark ring absent. Basal region of hemelytra light brown with venation conspicuously ivory to yellow; membrane blackish.

Z. cervicalis occupies a typical Lower Austral range, from Virginia to Florida, west to Arizona and California, southward into Mexico, throughout which it is an abundant species (Blatchley claimed it was the most common reduviid in Florida). It is the more remarkable therefore that the species was missed by early collectors and not named until 1872.

In Virginia, *cervicalis* records are primarily for the Coastal Plain, and Piedmont south of the James River: Accomack, Brunswick, Dinwiddie, Greensville, Henrico, Mecklenburg, Nottoway, Pittsylvania, Prince George, Roanoke, Southampton, and Smyth counties, and the cities of Chesapeake, Richmond, Suffolk, and Virginia Beach.

Of the foregoing, the record for Accomack County (Assateague Island, 24 July 1998, S. M. Roble) appears to be the northernmost known for this species. That for Smyth County (8.5 km ENE of Chatham Hill, 9 September 1988, C. A. Pague & R. L. Hoffman) is of special interest in being widely disjunct from the main part of the species' range. The lack of records for both Kentucky and Tennessee would seem to exclude the possibility of a distribution like that of *Sirthena stria* (Map 29) unless the Virginia population is a relict from a previously existing interior range. Continuity with the eastern populations across southwest Virginia remains to be demonstrated, and seems unlikely. The possibility of accidental mislabeling cannot, of course, be excluded until additional material is secured at or near the Smyth County site.

Capture dates indicate a basically late summer activity peak for adults:

April	1
May	3
June	-
July	4
August	9
September	8
October	2

[*Zelus longipes* (Linnaeus)]

The striking coloration will distinguish this species from all other zelines in this region: body orange with legs, antennae, a stripe behind each eye, disk of pronotum, base of each elytron and membrane black.

For decades this species was listed in the literature (including Blatchley 1926) under the name *bilobus* of Say. In 1986 *bilobus* was considered by Hart to be a strict junior synonym of *longipes*. Froeschner (1988) cited many states of record including Connecticut, Massachusetts, and Maine, and the provinces of Alberta and British Columbia, all five of which seem implausible in the light of recent records. I have seen no specimens from Virginia nor from anywhere further north than Ocrakoke Island, Hyde Co., North Carolina [USNM 1, W. E. Steiner, 5-8 September 1986]. This is 100 miles south of the state line, and close enough to qualify *longipes* as a possible resident of extreme southeastern Virginia even if the New England records are spurious.

230. *Zelus luridus* Stål
Map 45

In Virginia specimens males are 11-14 mm long, females 14-17 mm. The coloration is extremely variable in males: some are almost uniformly light brown or beige with yellow legs, in some the head is black, in others the entire dorsal surface including antennae and tibiae is piceous to pure black. Femora always with apical dark ring, varying from red to black. Females, however, are invariably brown or tan, without black anywhere on the body. In living or fresh specimens, the body is often nearly uniform light green.

This species was treated by Blatchley and many other workers as *Zelus exsanguis* Stål, 1862. Hart (1986: 539) however restricted *exsanguis* to a species occurring in Texas and southward, reviving *luridus* for the common species with humeral spines of eastern North America.

It is exceptionally widely distributed from Quebec to Wyoming and Manitoba, and southward through Central America, but apparently scarce or missing from southeastern United States: Blatchley had no reliable records for Florida.

In Virginia, *Z. luridus* appears to be statewide at lower elevations, with records for Accomack, Albemarle, Alleghany, Amherst, Dickenson, Fairfax, Floyd, Frederick, Giles, Greensville, Halifax, Highland, Montgomery, Nelson,

Northampton, Patrick, Pittsylvania, Prince Edward, Prince George, Pulaski, Roanoke, Shenandoah, Southampton, and Wythe counties, and the cities of Richmond, Suffolk, and Virginia Beach. VMNH specimens were mostly collected by sweeping or hand-capture from inflorescences, only a few are from pitfalls or malaise traps. Individuals are only rarely attracted to lights.

Capture records for 45 adults are distributed as follows:

May	16
June	19
July	7
October	1

Single nymphs in the 4th stadium were taken in February, March and mid-May; such immatures are often swept throughout the summer months.

In occasional specimens the humeral pronotal spines are much reduced, such individuals are readily separated from *cervicalis* by the presence of apical femoral rings.

231. *Zelus tetracanthus* Stål Map 46

Our smallest local member of the genus, males 12-13 mm long, females 14 mm. In life, *tetracanthus* is a beautifully ornamented insect: generally light brown with dorsum of head black, front lobe of pronotum infuscated, femora pale (ochre or yellow) basally, the extreme apex crimson, subtended by a broad black ring, a much narrower white ring, and a broader but more diffuse brown ring; tibiae brown with poorly defined darker rings; claval-corial region of hemelytra brown with prominent lighter veins, membrane piceous, radius vein thickened and with conspicuous ivory-white marking at junction with subcosta.

In the very inclusive definition proposed by Hart, this species occurs entirely across southern Canada, all

of the United States, and southward as far as Paraguay, a remarkable distribution. In Virginia, it is not frequently collected and we have only a few records:

Dickenson Co.: Breaks Interstate Park, 1-14 July 2000, Robert Vigneault (VMNH 1). **Dinwiddie Co.:** Fort Pickett, pine savannah 2 km east of Birchin Lake, 5 July 2000, Anne C. Chazal (VMNH 1). **Fairfax Co.:** Falls Church, syntypes of *Z. audax*, Nathan Banks (AMNH); Vienna, H. G. Barber (USNM). **Gloucester Co.:** Catlett Island, York River, 15 July 2004, A. C. Chazal, S. Y. Erdle (VMNH 1). **King & Queen Co.:** without further data, 22 April 1939, L. A. Hettrick (VPISU 1). **City of Chesapeake:** "Dismal Swamp", 22 September 1973, J. O'Hop (VPISU 1).

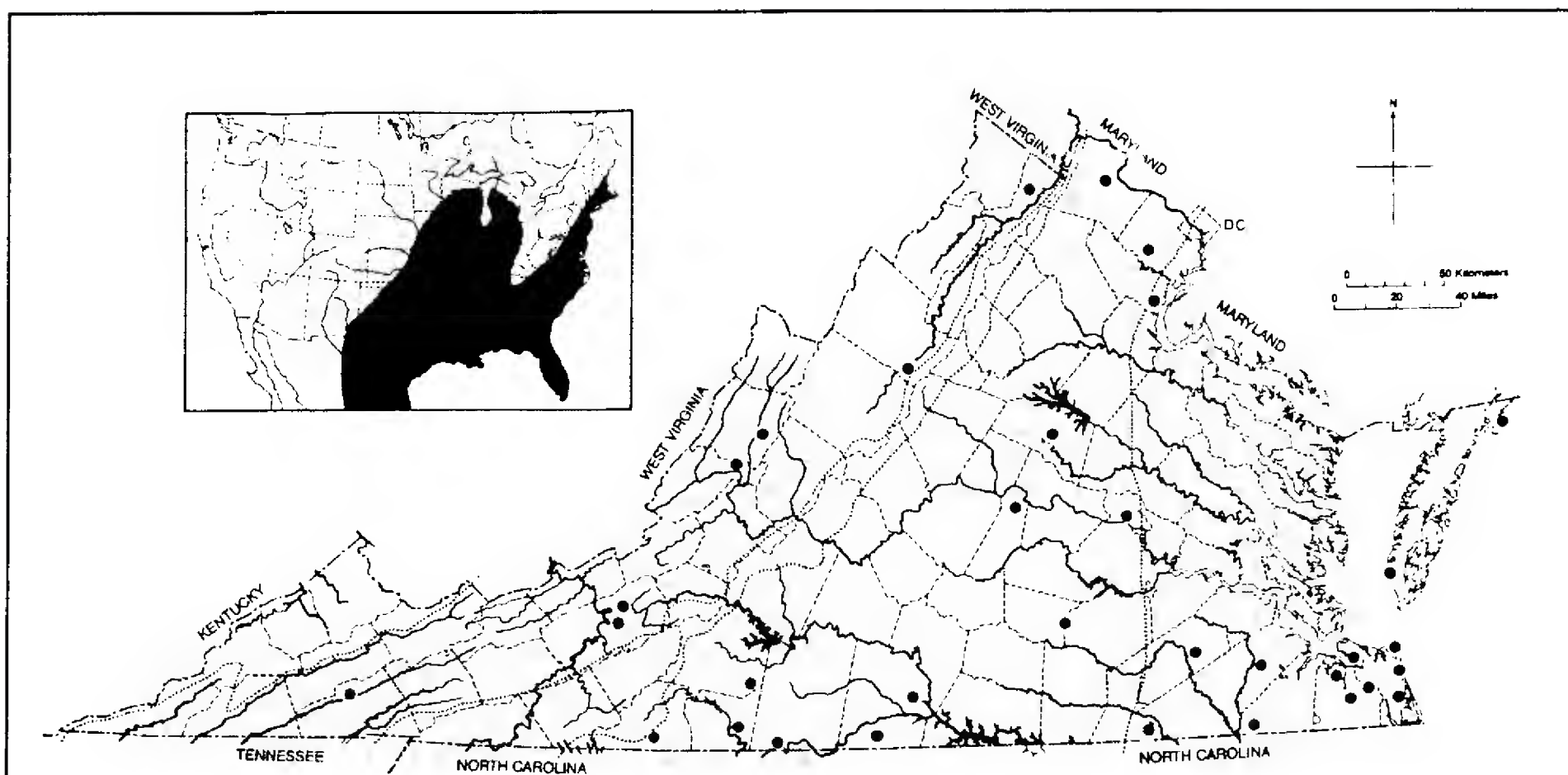
Prior to Hart's 1986 revision, three eastern species of *Zelus* with four pronotal spines were recognized: *Z. audax* Banks in the northeastern coastal region, *Z. angustatus* Hussey in Florida, and *Z. socius* (Uhler) recorded from much of North America. Hart subsumed all three names under the older *Zelus tetracanthus* (Stål, 1862) described from Mexico. While I do not question Hart's combination of *tetracanthus* and *socius*, and have not examined an extensive material, I have to wonder if the other two names might have claim to recognition at some taxonomic level. The Virginia specimens agree closely with the original concept of *audax*, and Hussey's proposal of *angustatus* was founded on a number of characters aside from coloration. Perhaps the subject can be re-examined at some later time when adequate study material has accumulated, particularly from the Atlantic coast states.

It is well-known that in this genus the 3rd and 4th antennomeres differ in appearance from the basal two in being finely and densely pubescent as well as much less sclerotized and not rigidly straight. The several Virginia specimens of *tetracanthus* are of interest in that the 3rd is notably thicker than 1st and 2nd, as much as 50% broader. This modification is not manifested at all in *luridus* and *longipes*, and only slightly so in *cervicalis*.

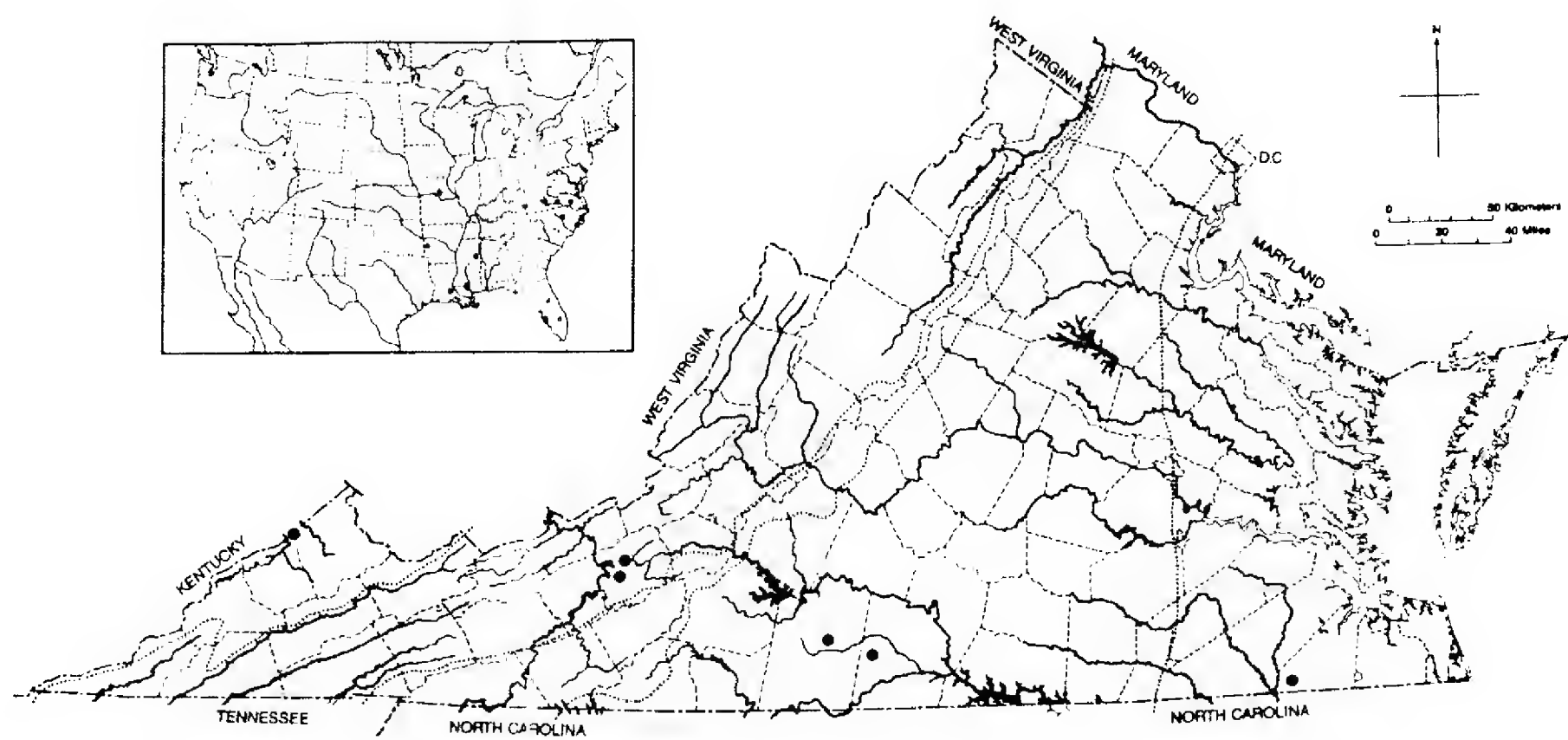
LITERATURE CITED

- Banks, N. 1909. Notes on our species of Emesidae. *Psyche*, 16: 43-48.
- Barber, H. G. 1914. New Hemiptera-Heteroptera, with comments upon the distribution of certain known species. *Journ. New York Ent. Soc.*, 22: 164-171.
- . 1924. A new species of *Pselliopus*. *Proc. Ent. Soc. Washington*, 26: 211-213.
- . 1930. Essay on the subfamily Stenopodinae of the New World. *Entom. Americana*, NS, 10: 149-238.
- Blatchley, W. S. 1926. The Heteroptera or True Bugs of Eastern North America, with Special Reference to the Faunas of Indiana and Florida. Nature Publishing Company, Indianapolis. 1116 pages.
- Blinn, R. L. 1994. Synopsis of the Saicinae (Heteroptera: Reduviidae) of America north of Mexico, with the description of a new species of *Saica* from the eastern United States. *Journ. New York Ent. Soc.*, 102: 62-66.
- Brimley, C. S. 1938. The Insects of North Carolina, being a list of the insects of North Carolina and their close relatives. North Carolina Dept. Agr., Raleigh. 560 pages.
- Caudell, A. N. 1901. The genus *Sinea* of Amyot & Serville. *Journ. New York Ent. Soc.*, 9: 1-11.
- Coscarón, M. C. 1983. Revision del genero *Rasahus*. *Rev. Mus. La Plata*, NS, 13: 75-138.
- Coscarón, M. C., & D. L. Carpintero. 1994. Revision of the genus *Melanolestes* Stål. *Ent. Scand.*, 24: 361-381.
- Davis, N. T. 1969. Contribution to the morphology and phylogeny of the Reduvioidea. Part IV. The harpactoroid complex. *Ann. Ent. Soc. America*, 62: 74-94.
- Davis, W. T. 1912. A new species of *Pselliopus* (Milyas). *Psyche*, 19: 20-21.
- Drew, W. A., & K. Schaeffer. 1963. The Reduvioidea of Oklahoma (Hemiptera). *Proc. Oklahoma Acad. Sci.*, 43: 98-112.
- Elkins, J. C. 1951. The Reduviidae of Texas. *Texas Journ. Sci.*, 3: 407-412.
- . 1954. A synopsis of *Atrachelus* (Hemiptera: Reduviidae). *Proc. Ent. Soc. Washington*, 56: 97-120.
- Froeschner, R. C. 1944. Contributions to a synopsis of the Hemiptera of Missouri. Pt. III. Lygaeidae, Pyrrhocoridae, Piesmididae, Tingidae, Enicocephalidae, Phymatidae, Ploiariidae, Reduviidae, Nabidae. *American Midl. Nat.*, 31: 638-683.
- . 1988. Family Reduviidae Latreille, 1807, pp. 616-651, in: T. J. Henry & R. C. Froeschner, eds., *Catalog of the Heteroptera, or true bugs, of Canada and the continental United States*. E. J. Brill, New York, 958 pp.
- Giacchi, J. 1969. Revision del genero *Stenopoda* Laporte, 1833 (Hemiptera, Reduviidae, Stenopodainae). *Physis*, 29: 1-26.
- . 1974. Revision de los Stenopodainos americanos. III. El genero *Narvesus* Stal, 1859 (Heteroptera: Reduviidae). *Physis*, Secc. C, 33: 53-64.
- . 1984. Revision de los Stenopodainos americanos. VI. Las especies americanas del genero *Oncocephalus* Klug, 1830 (Heteroptera-Reduviidae). *Physis*, Secc. C., 42: 39-62.
- . 1985. Revision de los stenopodainos americanos. VII. Redescription de los generos *Pnirontis* Stal, 1859; *Pnothermus* Stal, 1859; *Ctenotrachelus* Stal, 1868; *Ocrioessa* Bergroth, 1918, y *Kodormus* Barber, 1930 (Heteroptera: Reduviidae). *Physis*, Secc. C, 43: 61-70.
- Hagerty, A. M., & J. E. McPherson. 1999. Survey of the Reduviidae (Heteroptera) of southern Illinois, excluding the Phymatinae, with notes on biology. *The Great Lakes Entomologist*, 32: 133-160.
- Hart, E. R. 1986. Genus *Zelus* in the United States, Canada, and northern Mexico (Hemiptera: Reduviidae). *Ann. Ent. Soc. America*, 79: 535-548.
- Hoffman, R. L. 1953. The occurrence of several scarce assassin bugs in Virginia. *Proc. Ent. Soc. Washington*, 55: 263-265.
- . 2005. Distribution of *Ctenotrachelus shermani* Barber, an assassin bug new to the fauna of Virginia. *Banisteria* 24: 54-55.
- Hussey, R. F., & J. C. Elkins 1955. Review of the genus *Doldina* Stal (Hemiptera: Reduviidae). *Quart. Jour. Florida Acad. Sci.*, 261-278.
- Lent, H., & P. W. Wygodzinsky. 1979. Revision of the Triatominae (Hemiptera, Reduviidae), and their significance as vectors of Chagas' Disease. *Bull. American Mus. Nat. Hist.*, [vol.] 163: 123-520.
- Maldonado Capriles, J. 1990. Systematic catalogue of the Reduviidae of the world. *Caribbean Journ. Sci.* (Special Edition), Univ. Puerto Rico. 694 pages.
- McAtee, W. L. 1927. Notes on "Heteroptera or True Bugs of Eastern North America." *Bull. Brooklyn Ent. Soc.*, 22: 267-281.
- McAtee, W. L., & J. R. Malloch 1925. Revision of the

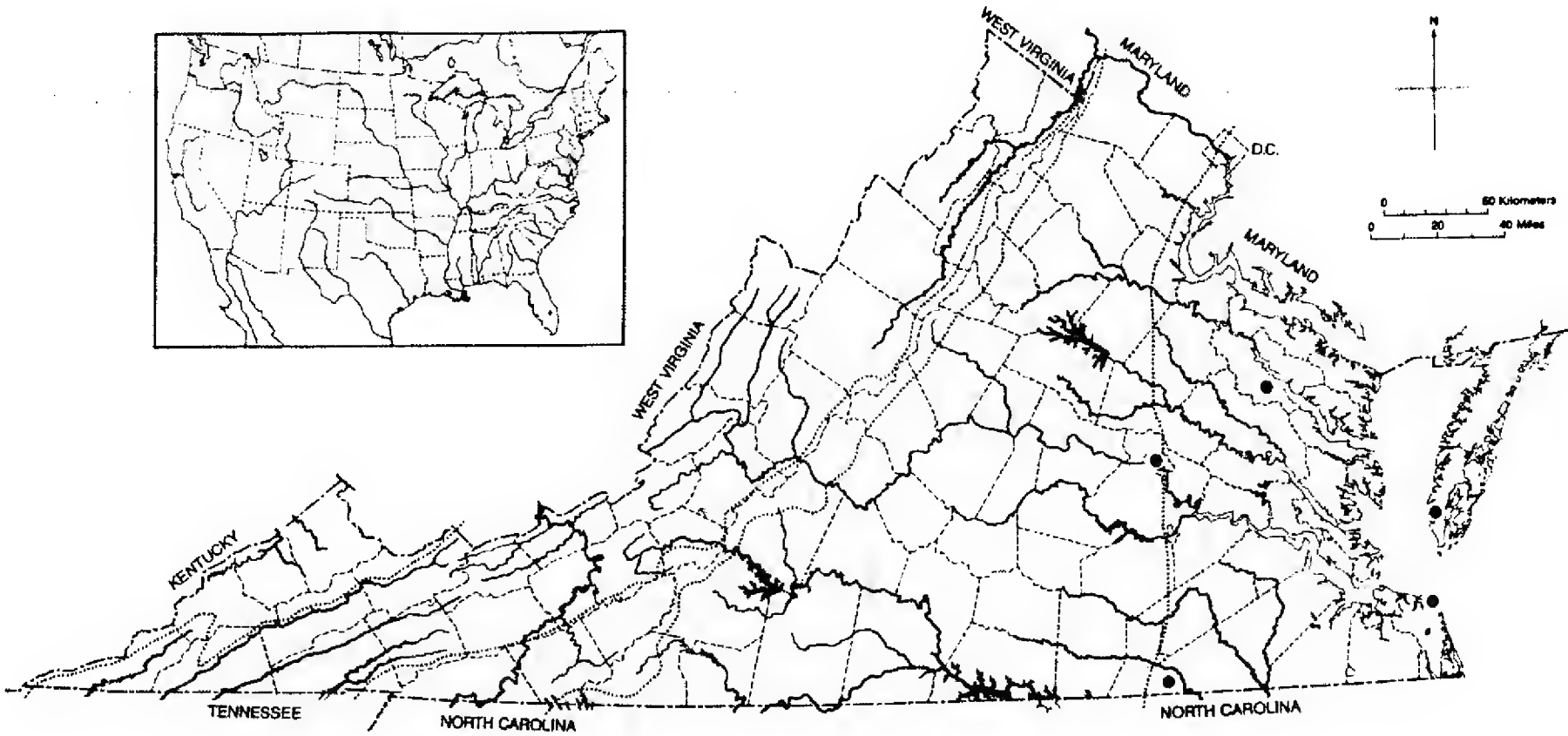
- American bugs of the reduviid subfamily Ploiariinae. Proc. U. S. Natl. Mus., 67: 1-153.
- McPherson, J. E. 1991a. Noteworthy range extensions of three emesine species (Heteroptera: Reduviidae). Great Lakes Ent., 24: 99-101.
- . 1991b. Range extensions of three emesine species in North America (Heteroptera: Reduviidae). Great Lakes Ent., 24: 263-264.
- . 1992. The assassin bugs of Michigan (Heteroptera: Reduviidae). Great Lakes Ent., 25: 25-31.
- McPherson, J. E., S. L. Keffer, & S. J. Taylor, 1991. Taxonomic status of *Melanolestes picipes* and *M. abdominalis* (Heteroptera: Reduviidae). Florida Ent., 74: 396-403.
- , S. J. Taylor, & S. L. Keffer. 1992. Evaluation of characters to distinguish *Fitchia aptera* and *F. spinosula* (Heteroptera: Reduviidae). Florida Ent., 75: 221-230.
- Radio, P. A. 1927. Studies on the biology of the Reduviidae of America north of Mexico. Univ. Kansas Sci. Bull., 17: 5-291.
- Schuh, R. T. & J. A. Slater. 1995. True bugs of the world (Hemiptera: Heteroptera). Classification and natural history. Cornell University Press, Ithaca, New York. 336 pp.
- Slater, J. A., & R. M. Baranowski. 1978. How to know the true bugs (Hemiptera-Heteroptera). Wm. C. Brown Publ., Dubuque. 256 pages
- Van Duzee, E. P. 1917. Catalog of the Hemiptera of American north of Mexico excepting the Aphididae, Coccidae, and Aleurodidae. Univ. California, Tech. Bull., Ent., 2: 1-902.
- Wheeler, A. G., Jr. 2000. *Fitchia aptera* Stål (Hemiptera: Reduviidae): seasonal history and habits in Mid-Appalachian shale barrens. Proc. Ent. Soc. Washington, 102: 1070-71.
- Wygodzinsky, P. W. 1966. A monograph of the Emesinae (Reduviidae, Hemiptera). Bull. American Mus. Nat. Hist., [no.] 133: 1-614.
- Wygodzinsky, P. W., & J. C. Giacchi. 1994. Key to the genera of Stenopodainae of the New World (Insecta, Heteroptera, Reduviidae). Physis, Secc. C, 49: 5-9.



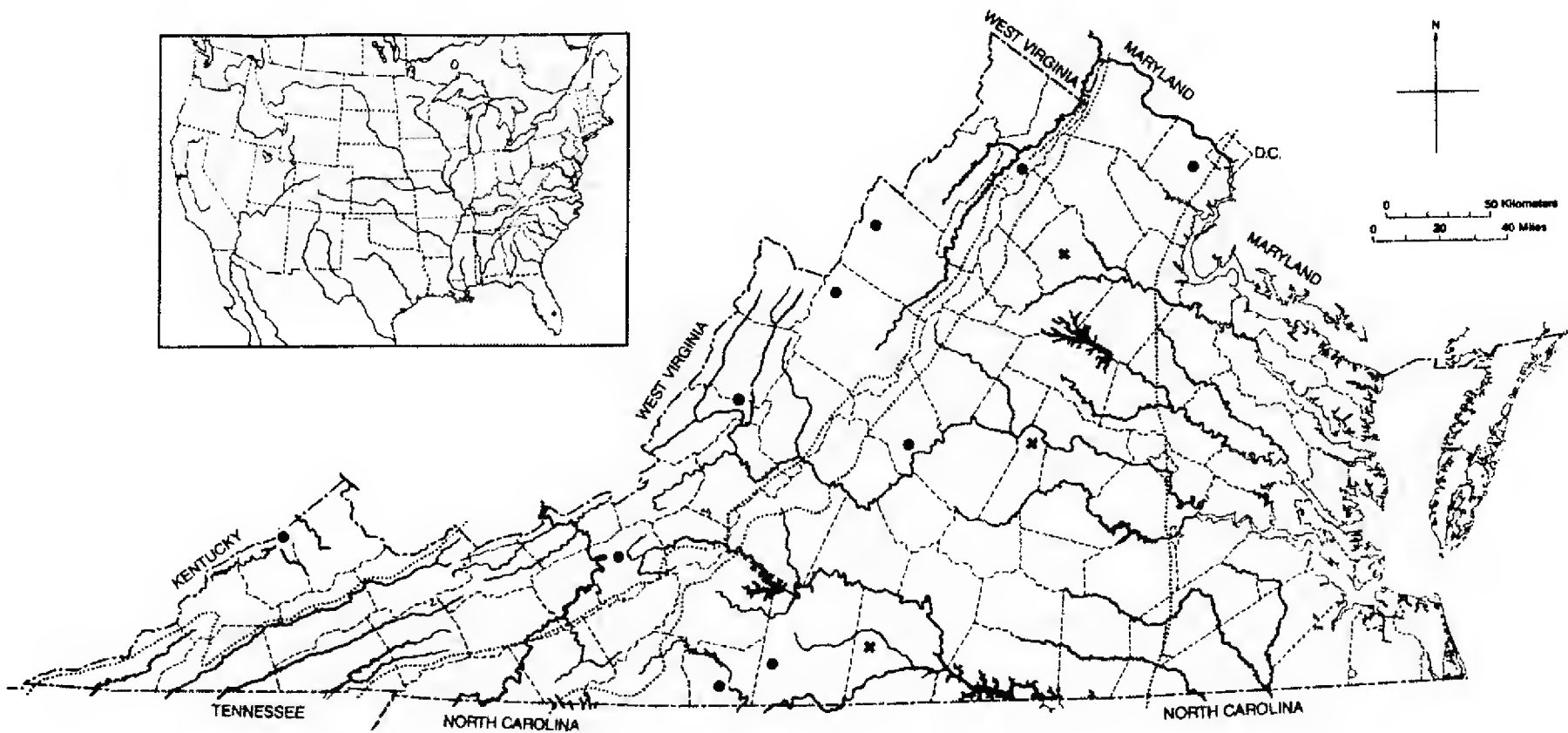
Map 1. *Oncerotrachelus acuminatus* (Say).



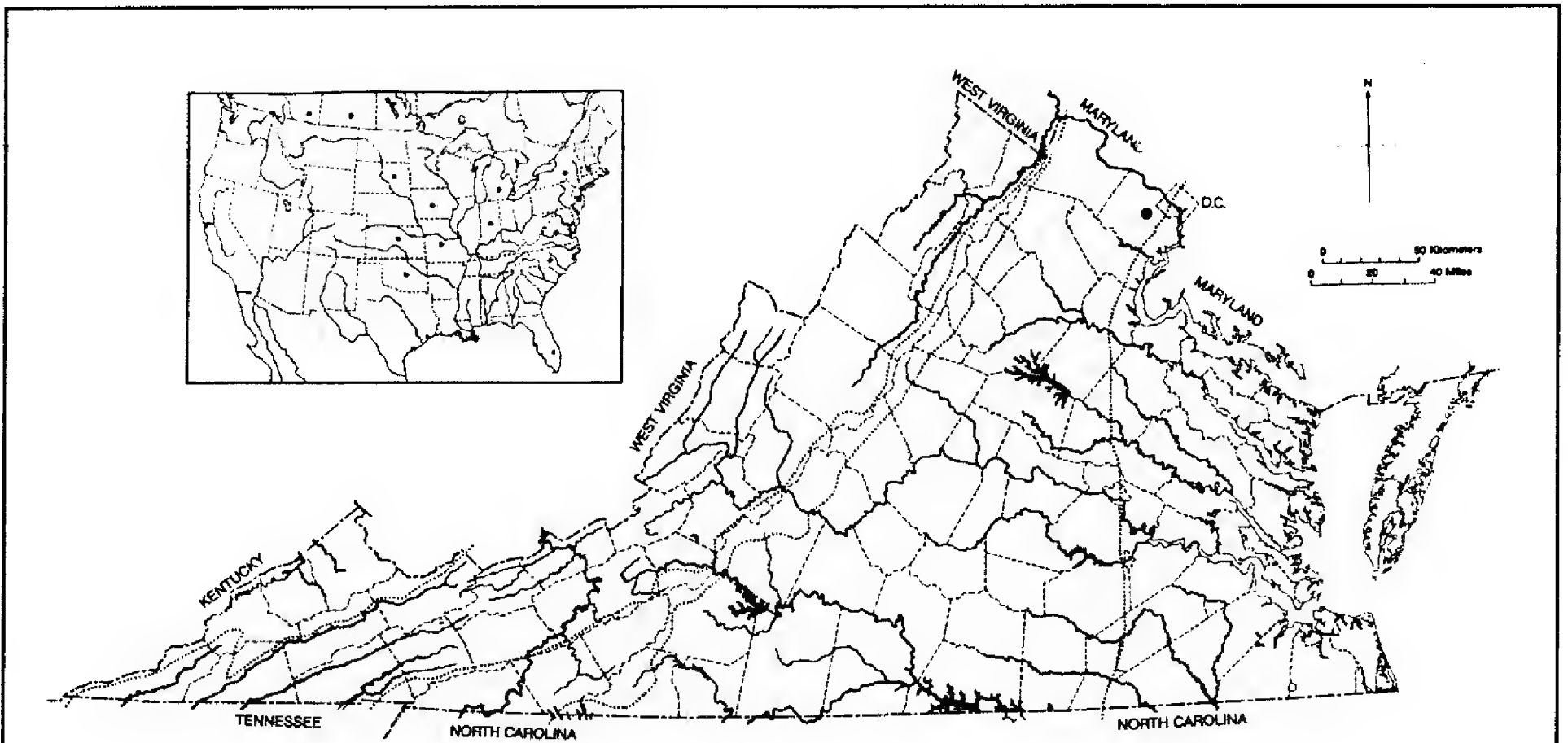
Map 2. *Saica elkinsi* Blinn. Only states of record are indicated on the inset map.



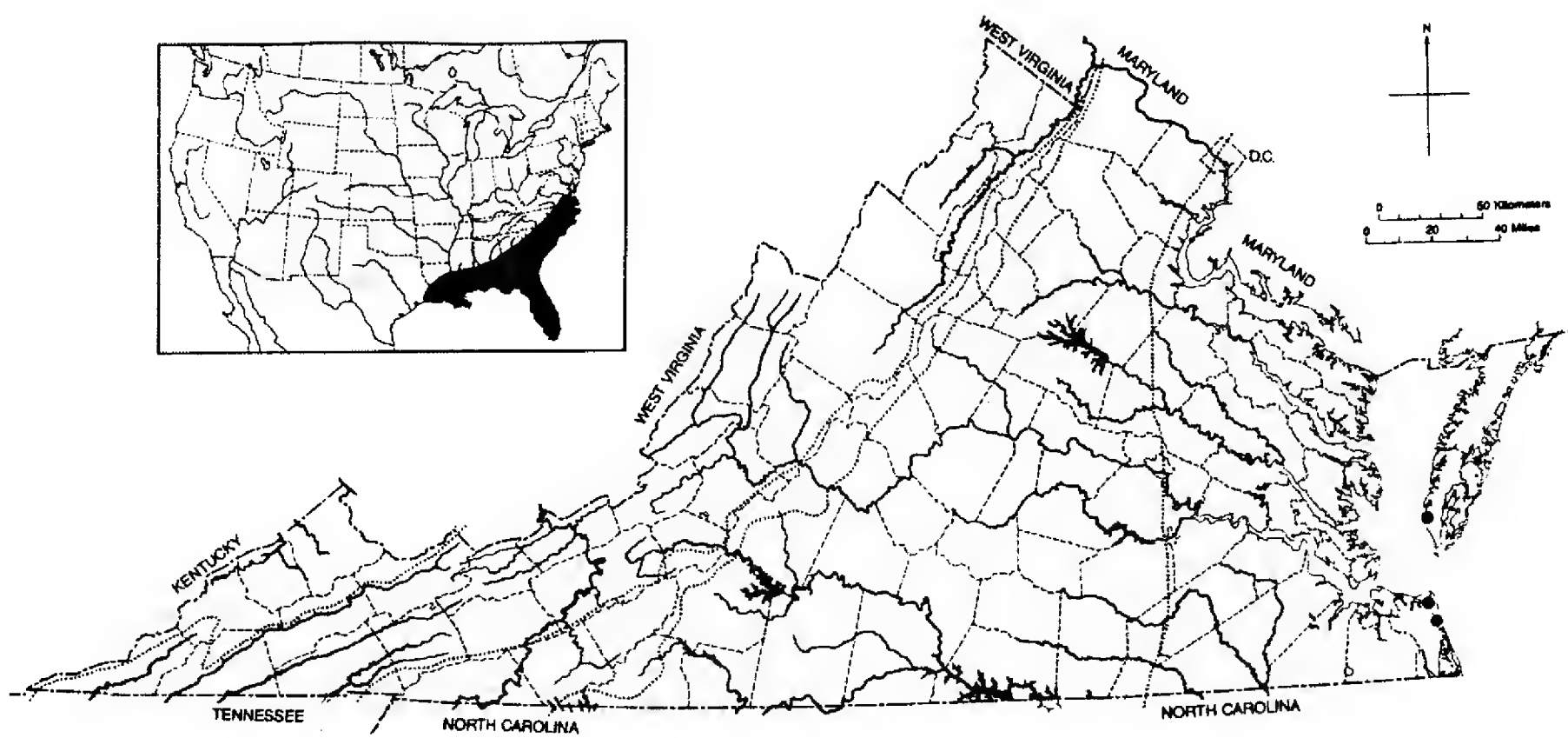
Map 3. *Barce fraterna fraterna* (Say). The inset map is not shaded owing to uncertainty about published records for this and the following taxon.



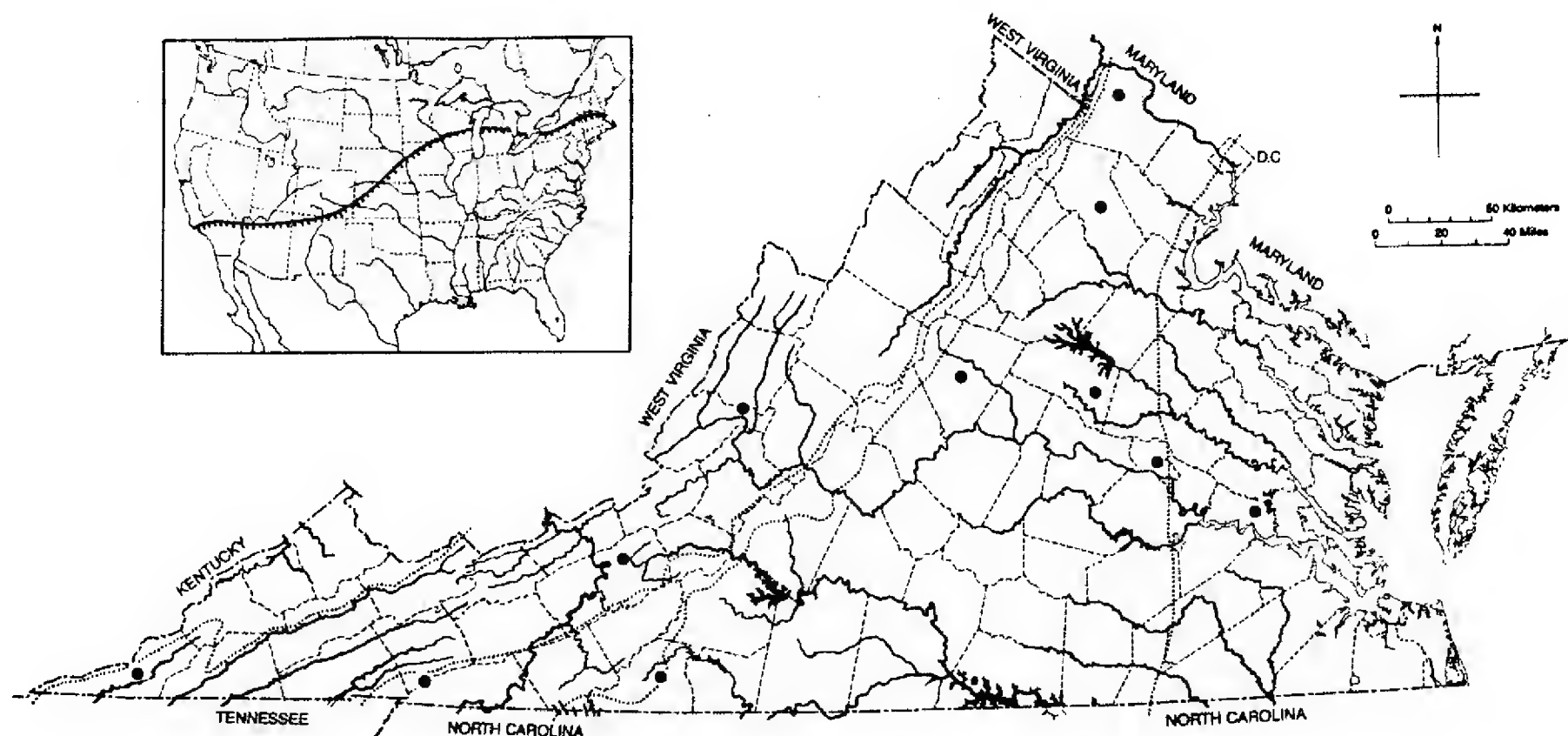
Map 4. *Barce fraterna annulipes* (Stål). Populations possibly intermediate between this subspecies and *B. f. fraterna* are indicated by the three × symbols.



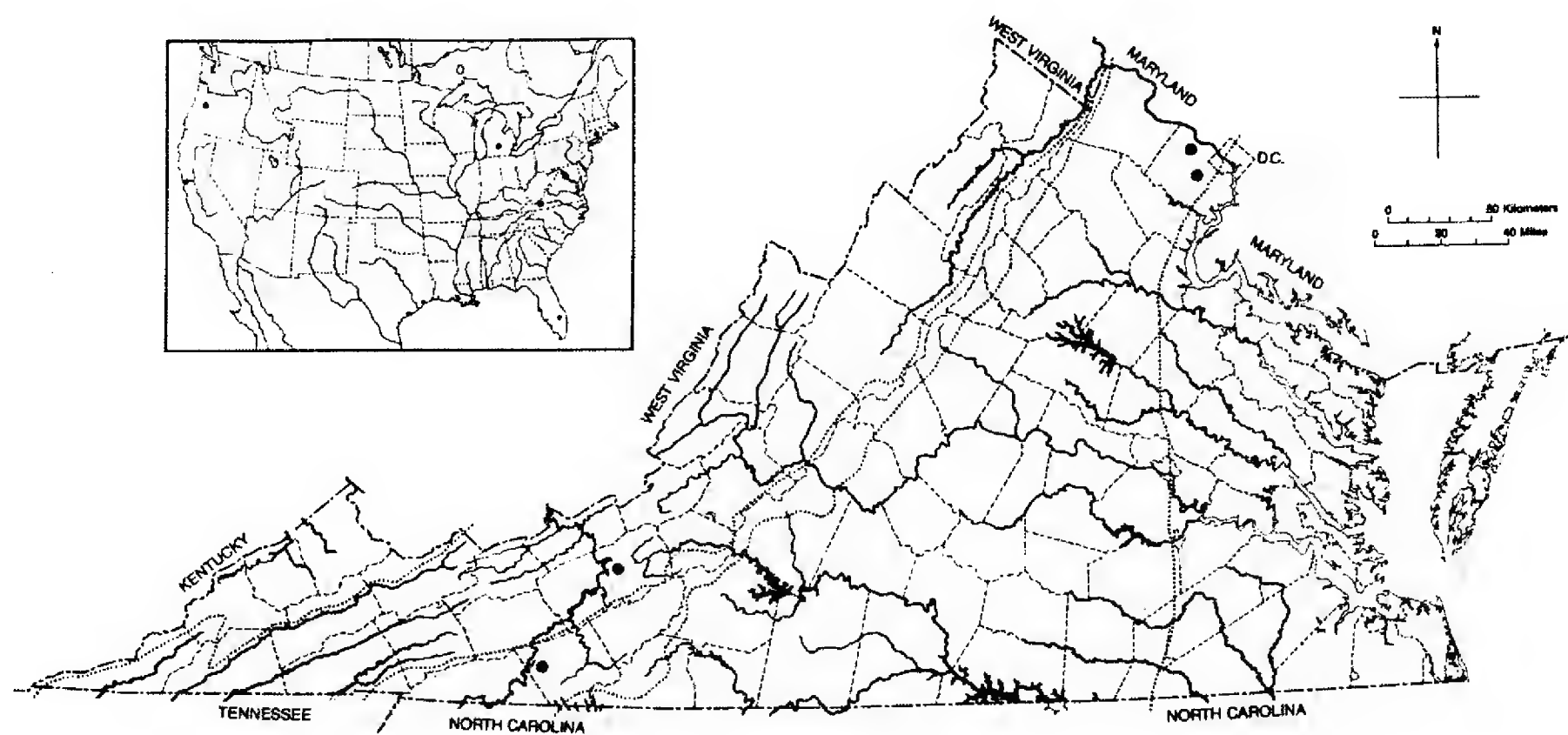
Map 5. *Barce uhleri* Banks. Only states and provinces of record for this species are indicated



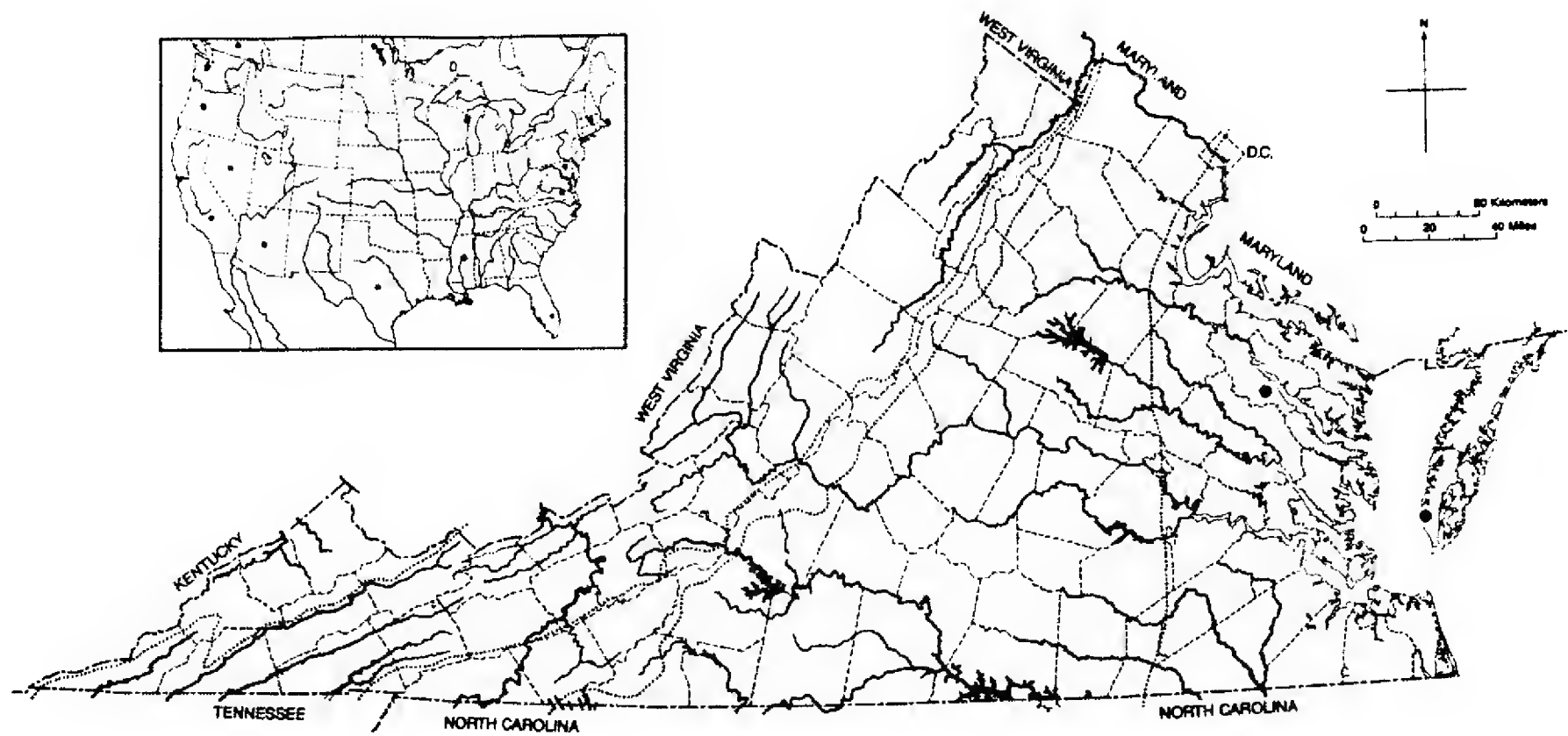
Map 6. *Barce wernerii* Wygodzinsky.



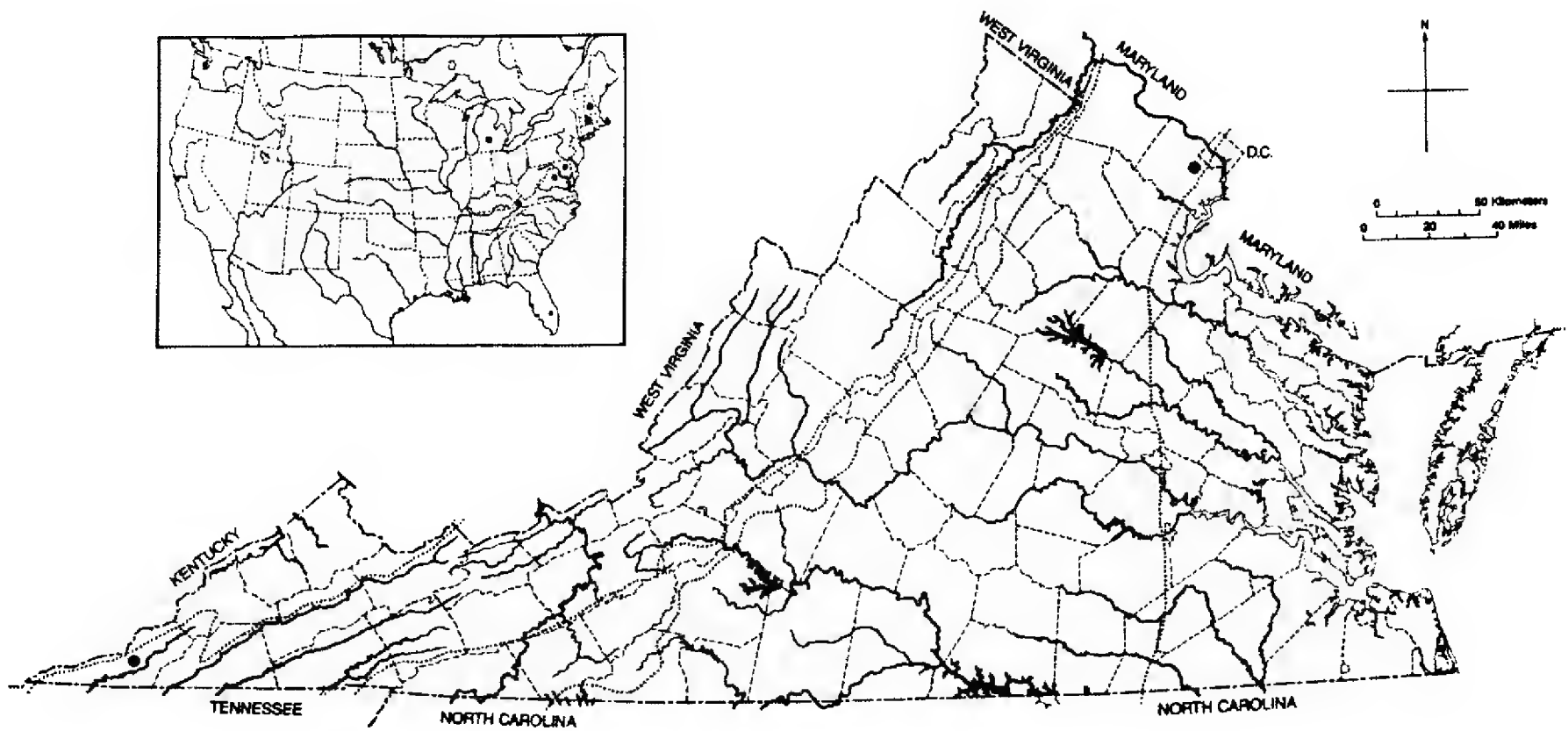
Map 7. *Emesaya brevipennis brevipennis* (Say). The inset map shows only the range of the species (south and east of the hatched line) and does not represent the southern subspecies *E. b. australis*.



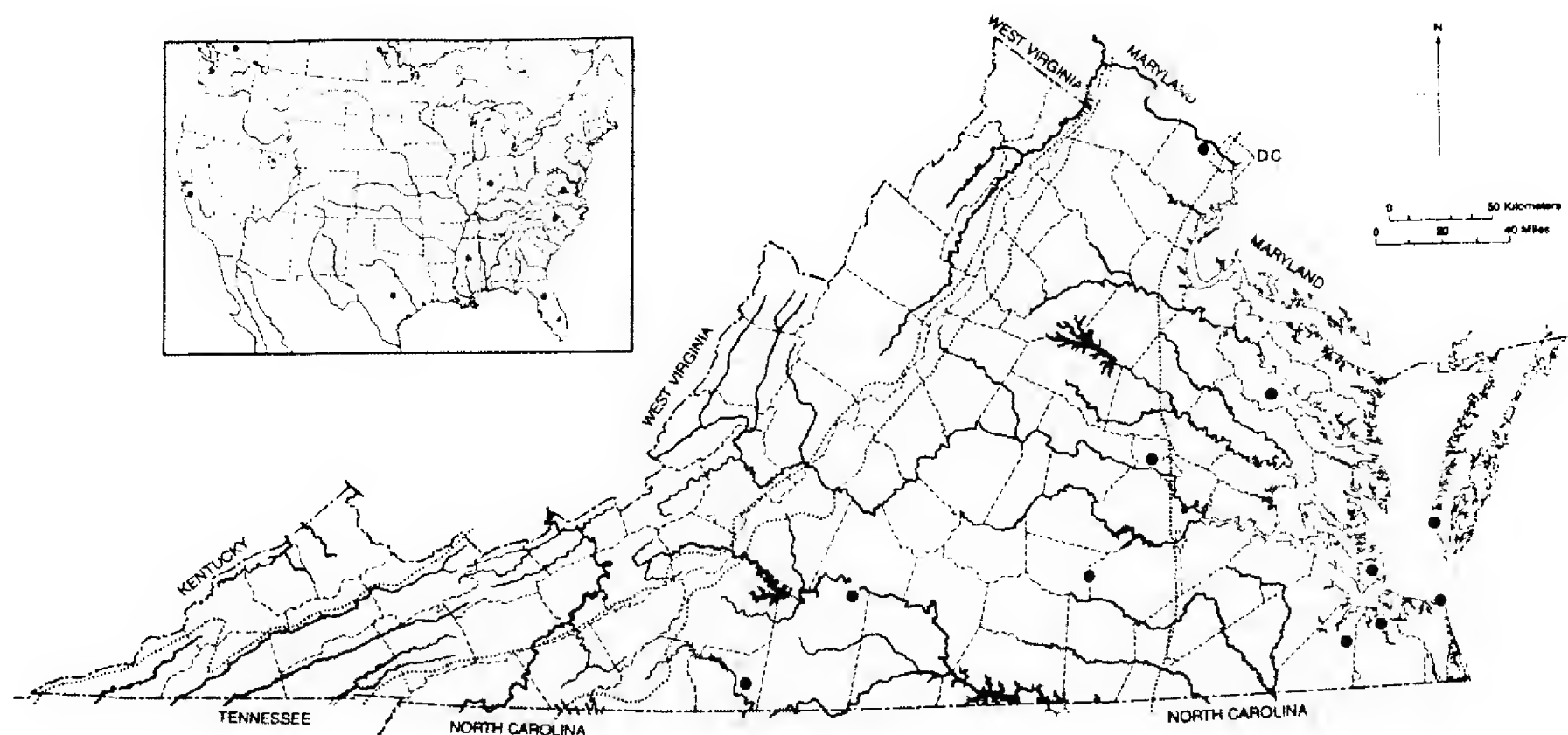
Map 8. *Empicoris culiciformis* (DeGeer). Owing to the paucity of records for this introduced species, only states of record are indicated on the inset map.



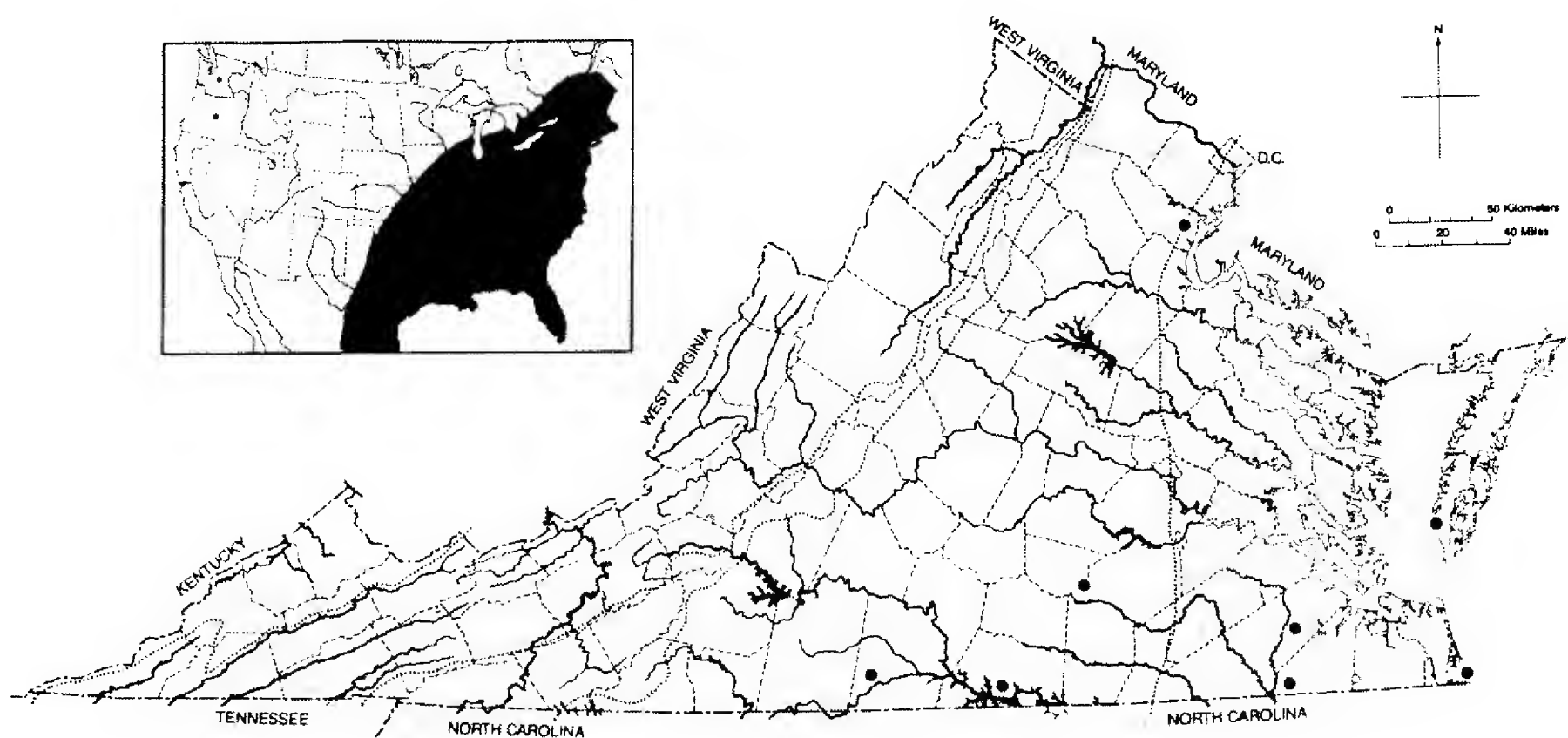
Map 9. *Empicoris orthoneuron* McAtee & Malloch. This species may occur in all of the 50 lower states and adjacent provinces.



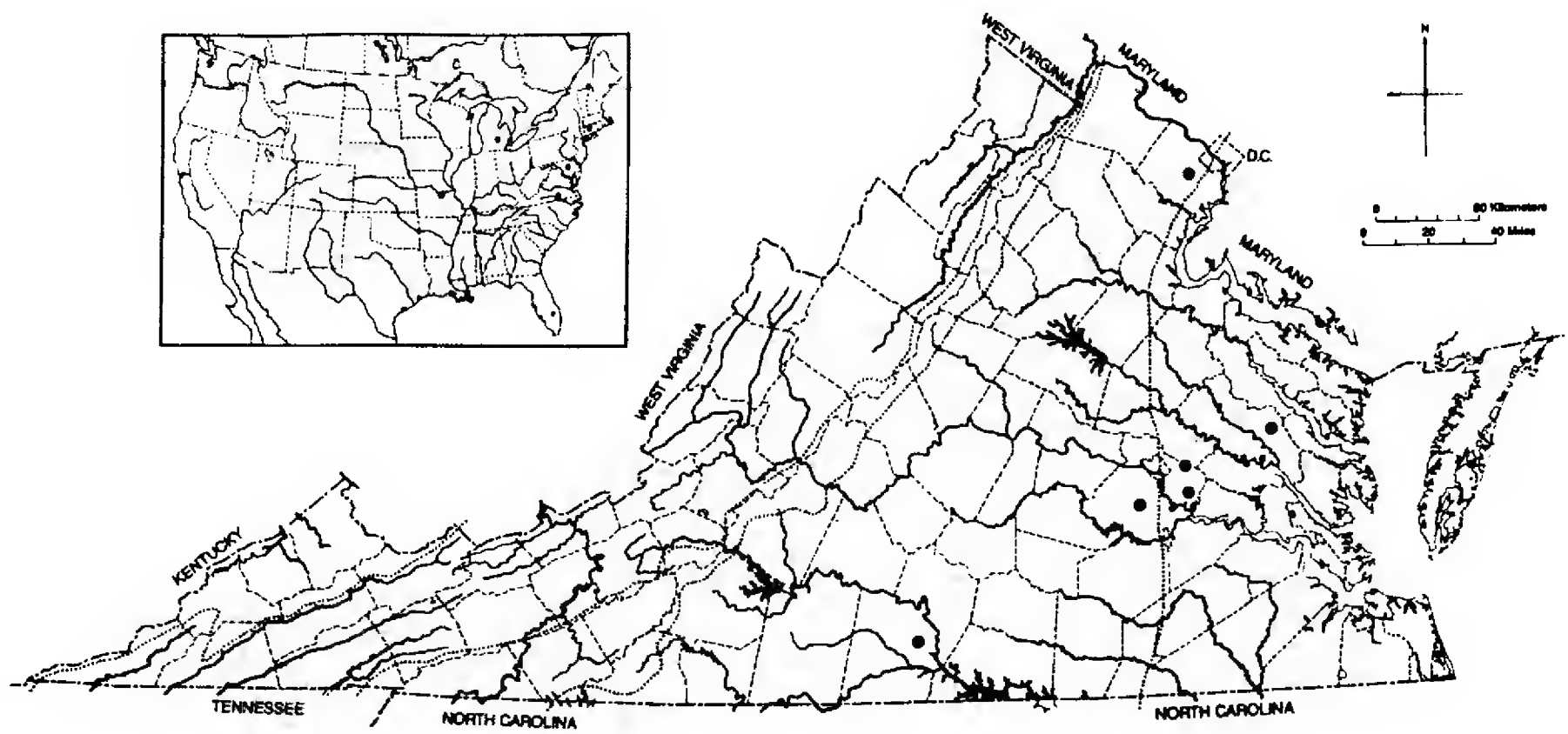
Map 10. *Empicoris parshleyi* (Bergroth). This species is probably distributed throughout the Appalachian region; possibly absent from the Coastal Plain in Virginia.



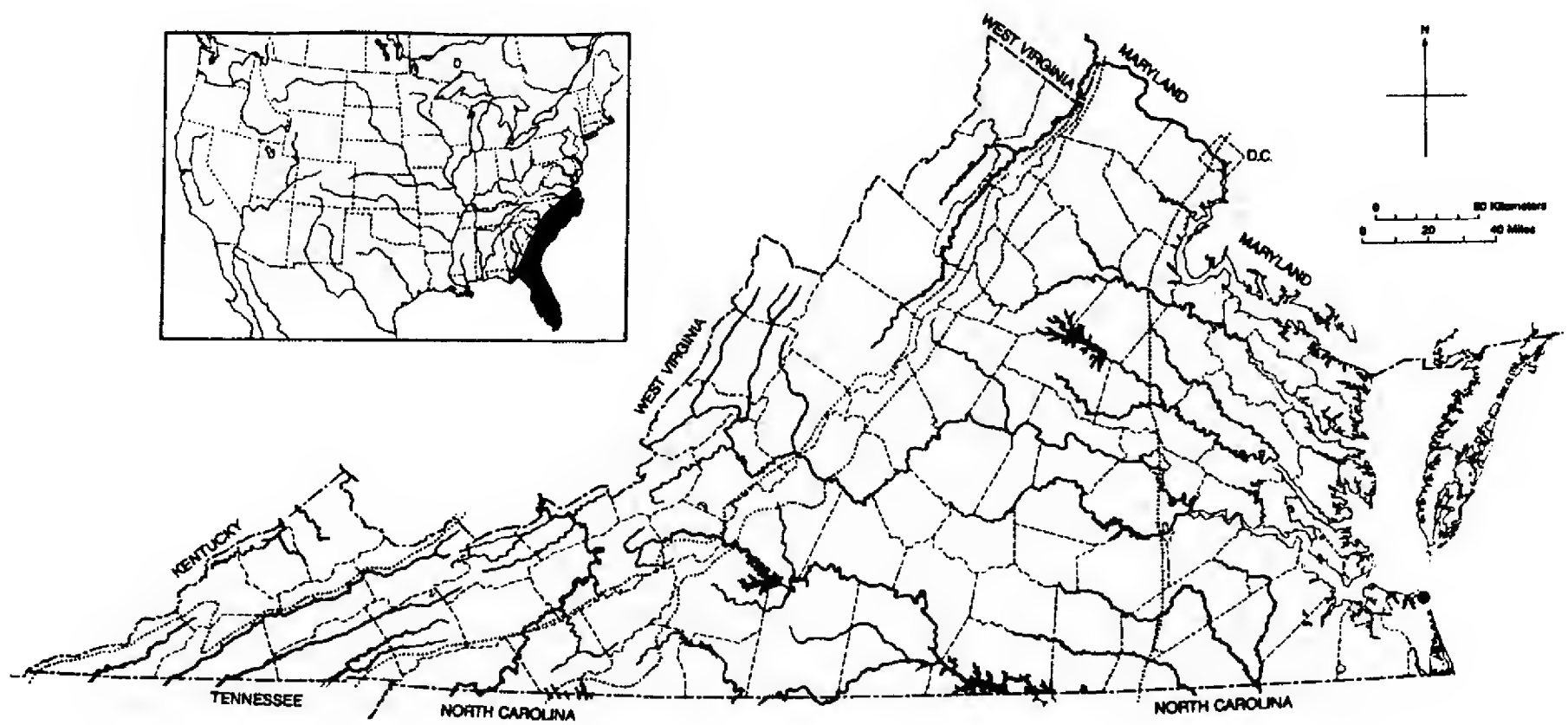
Map 11. *Empicoris rubromaculatus* (Blackburn). The species is probably statewide in Virginia.



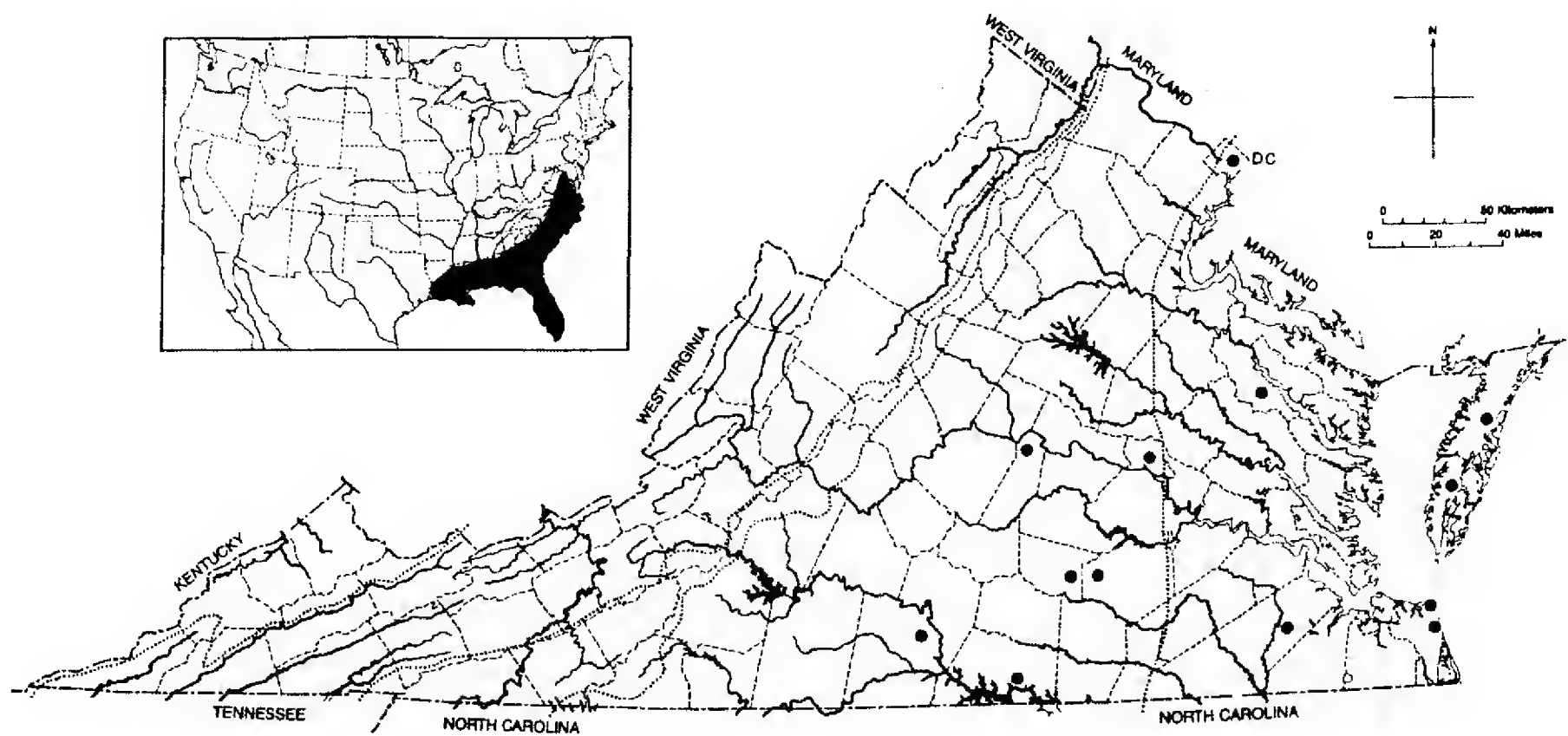
Map 12. *Empicoris tuberculatus* (Banks). Like *rubromaculatus*, probably statewide.



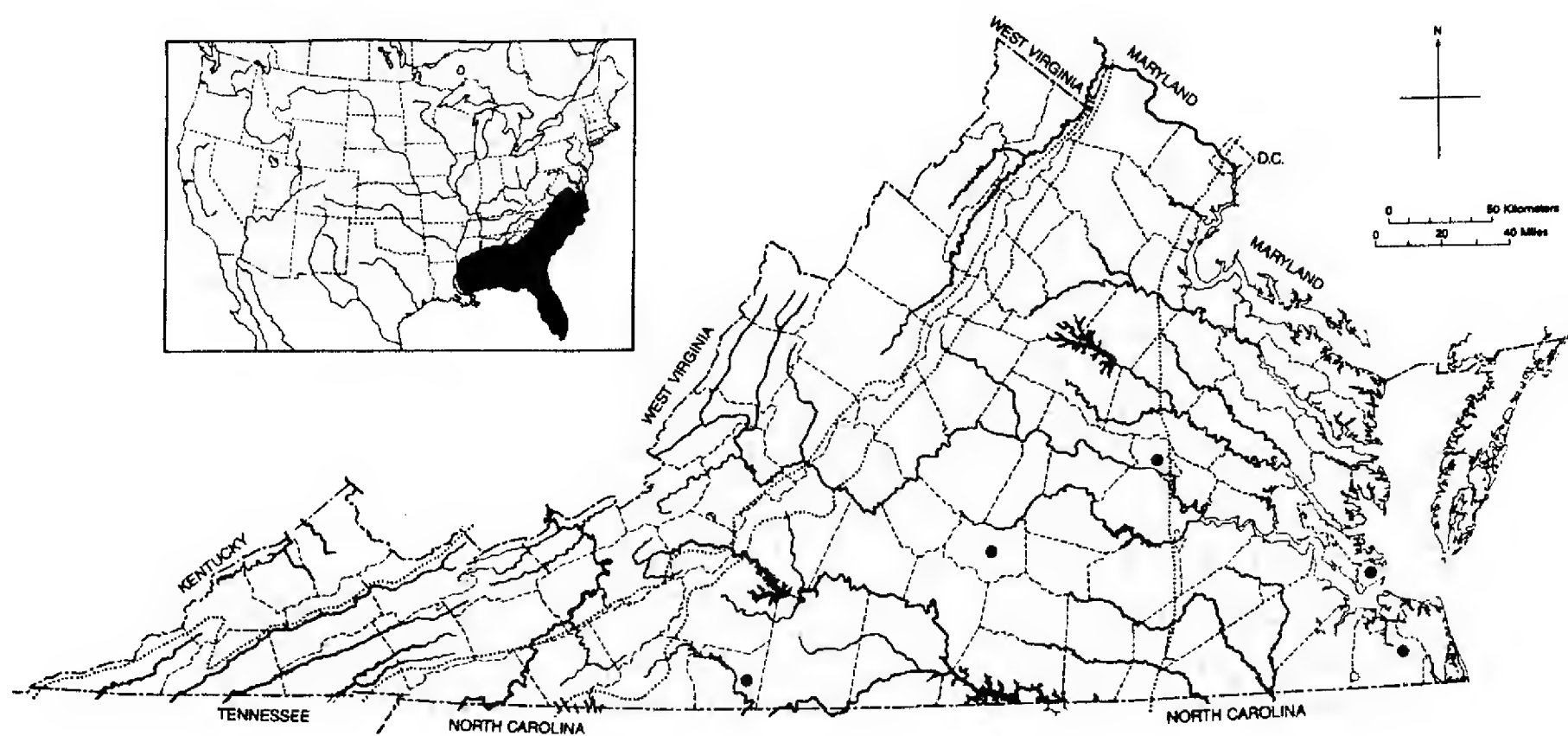
Map 13. *Empicoris winnemana* McAtee & Malloch. The inset map shows only states of known occurrence.



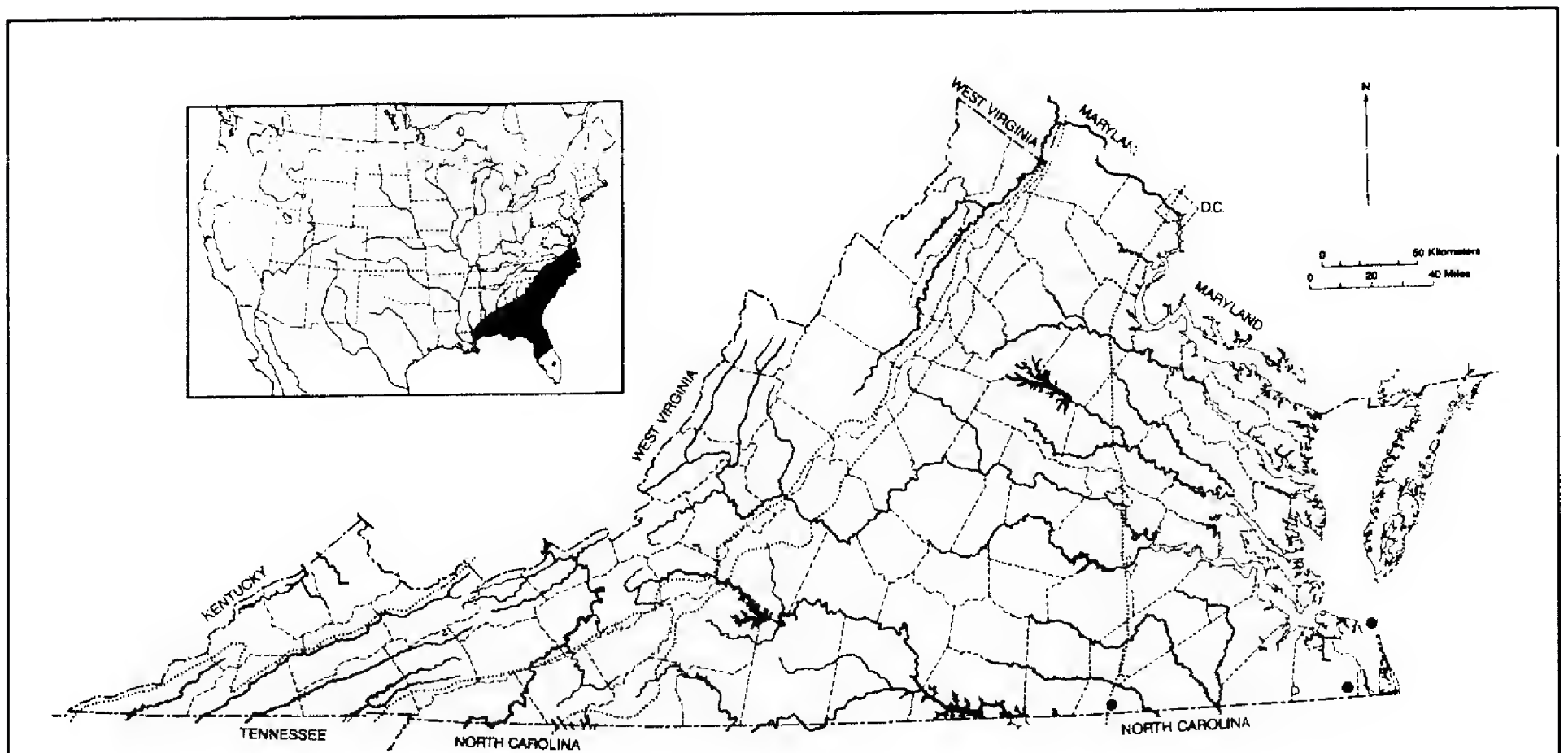
Map 14. *Ploriaria carolina* Herrich-Schaeffer.



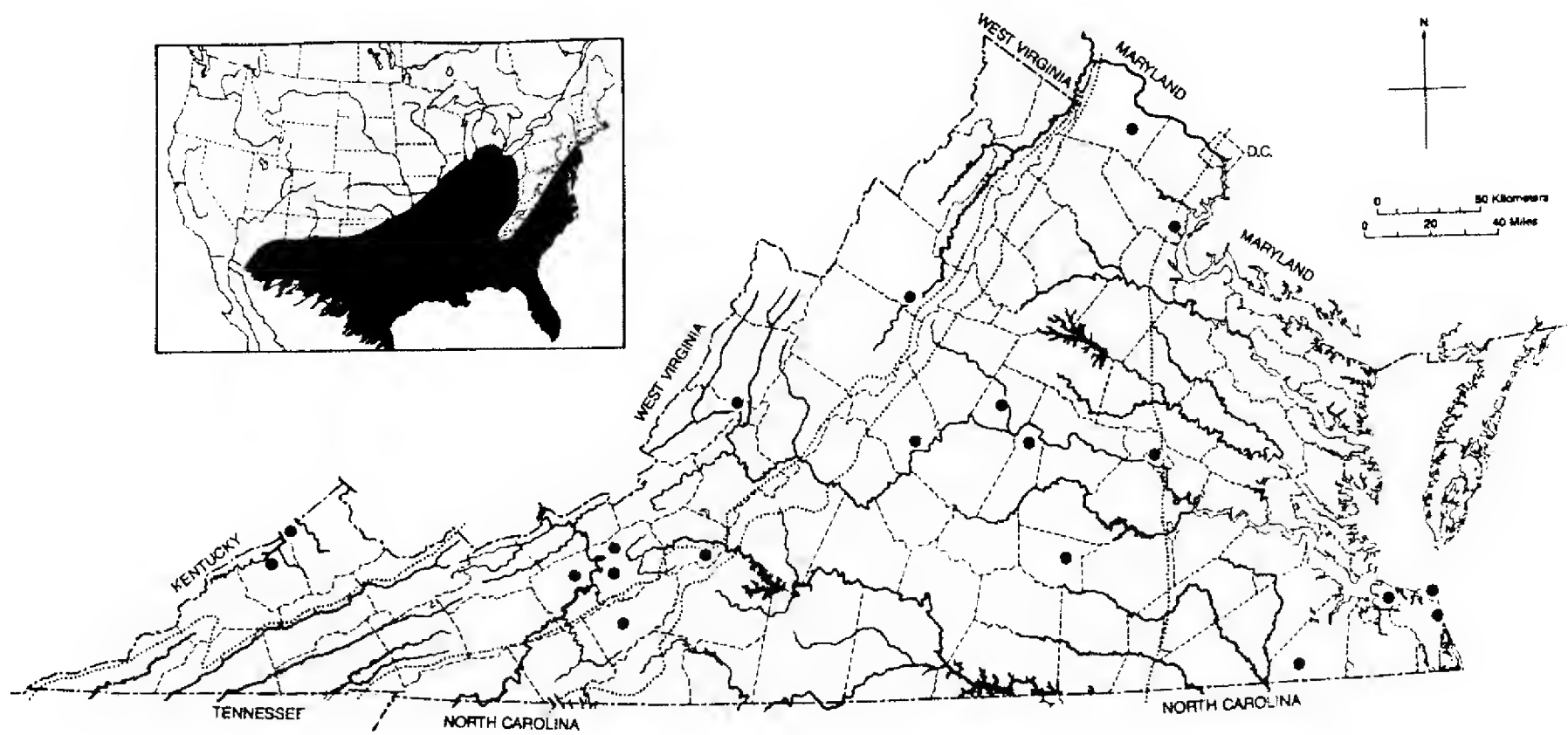
Map 15. *Ploriaria hirticornis* (Banks).



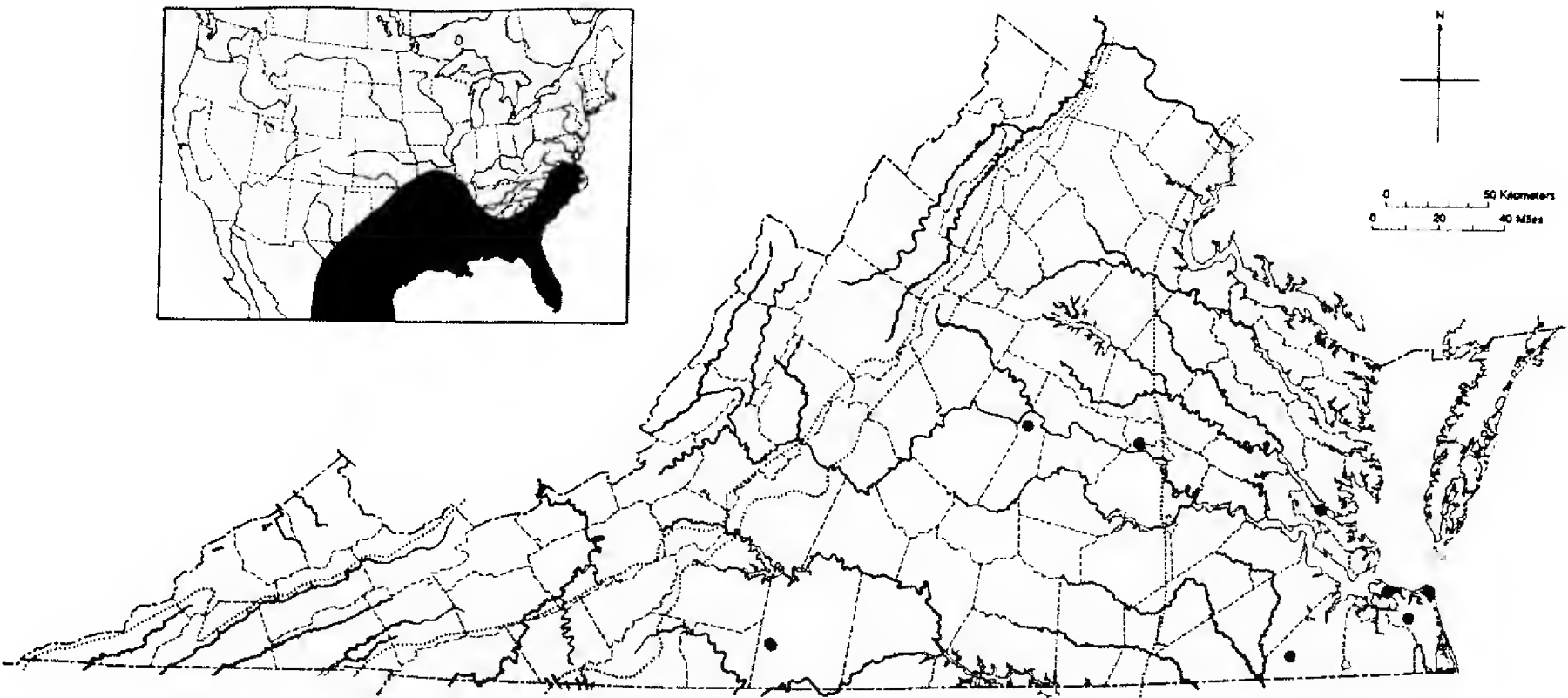
Map 16. *Stenolemus lanipes* Wygodzinsky.



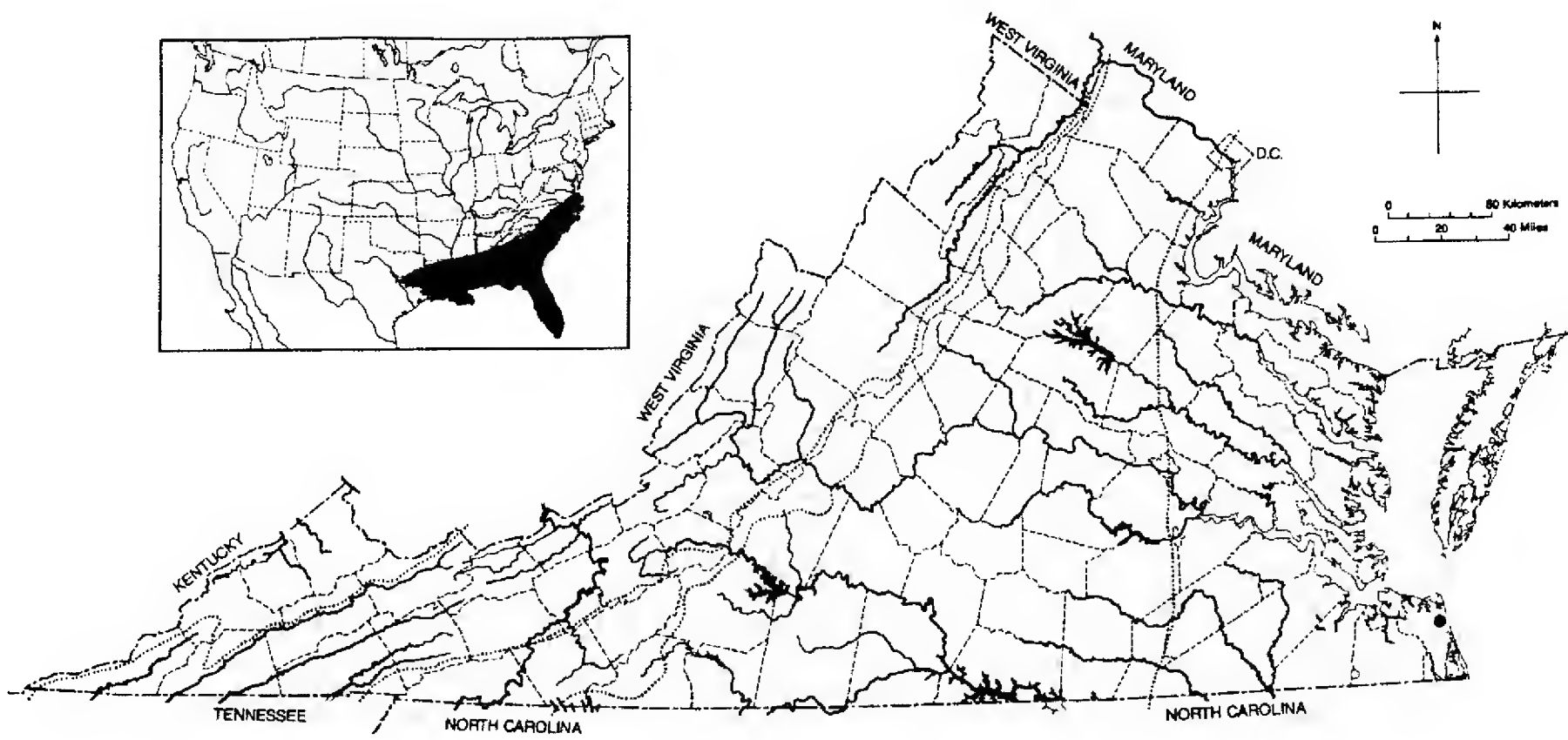
Map 17. *Ctenotrachelus shermani* Barber. The species has also been recorded from Texas.



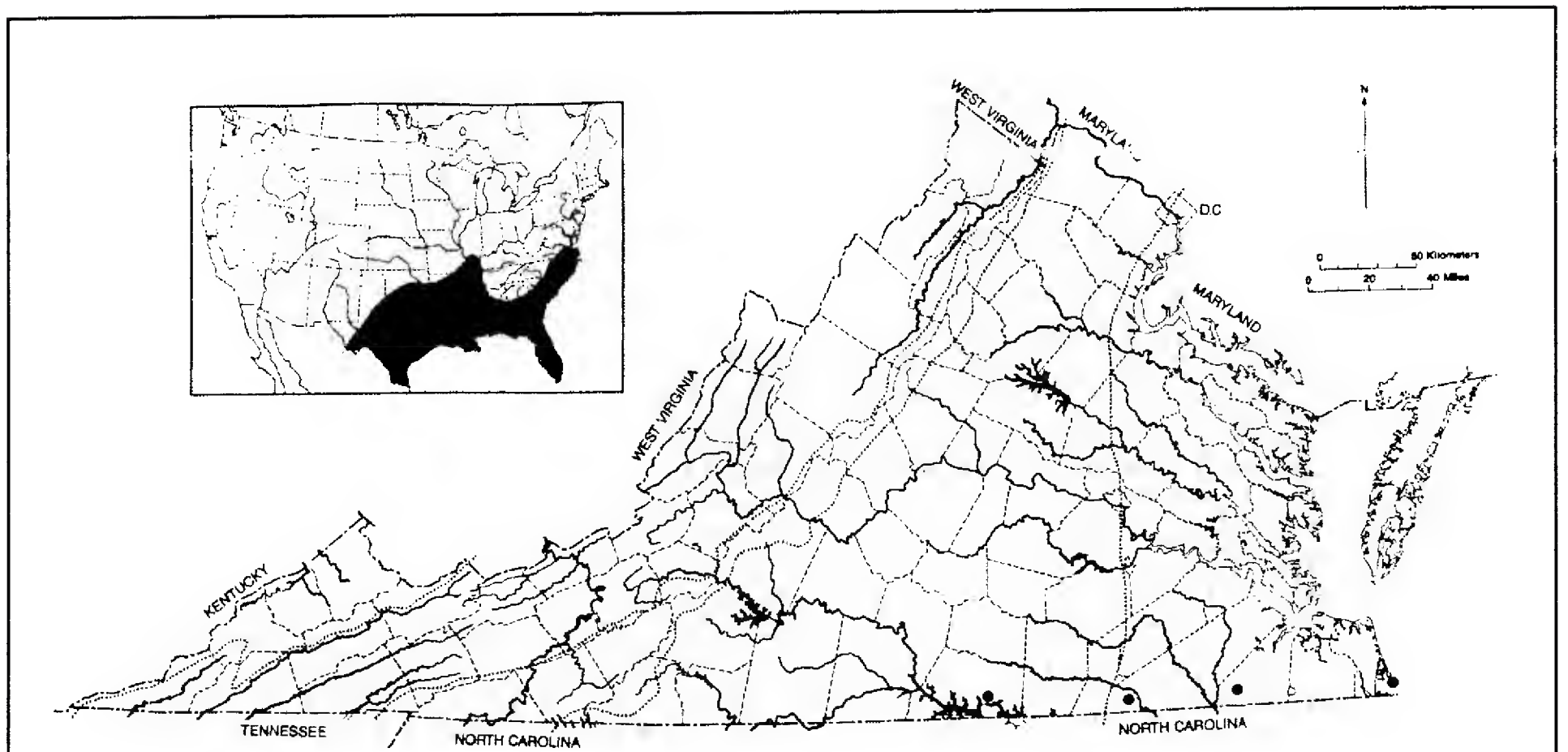
Map 18. *Narveus carolinensis* Stål. Distribution in Mexico unknown, but surely in all its northern states.



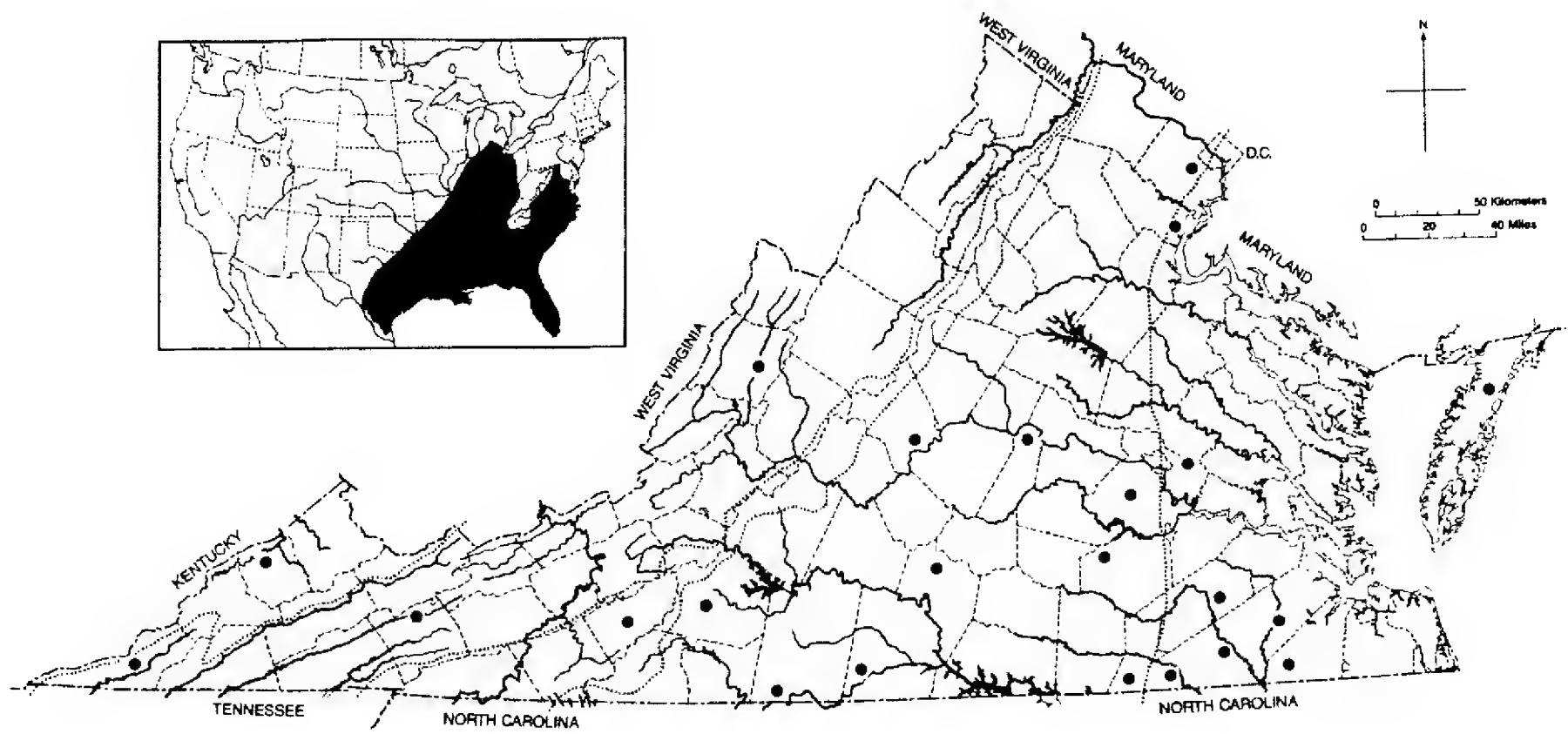
Map 19. *Oncocephalus geniculatus* Stål.



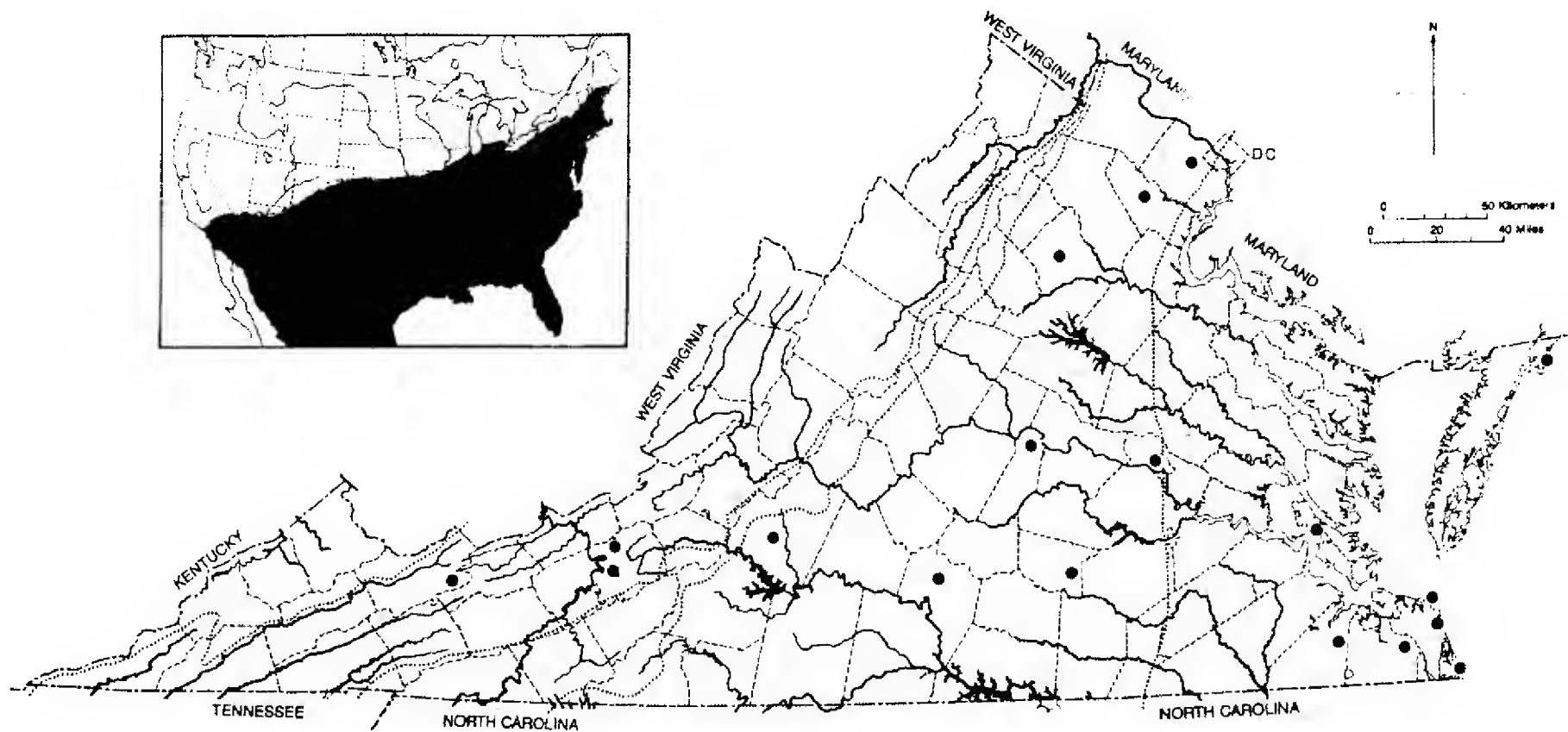
Map 20. *Pnirontis brimleyi* Blatchley.



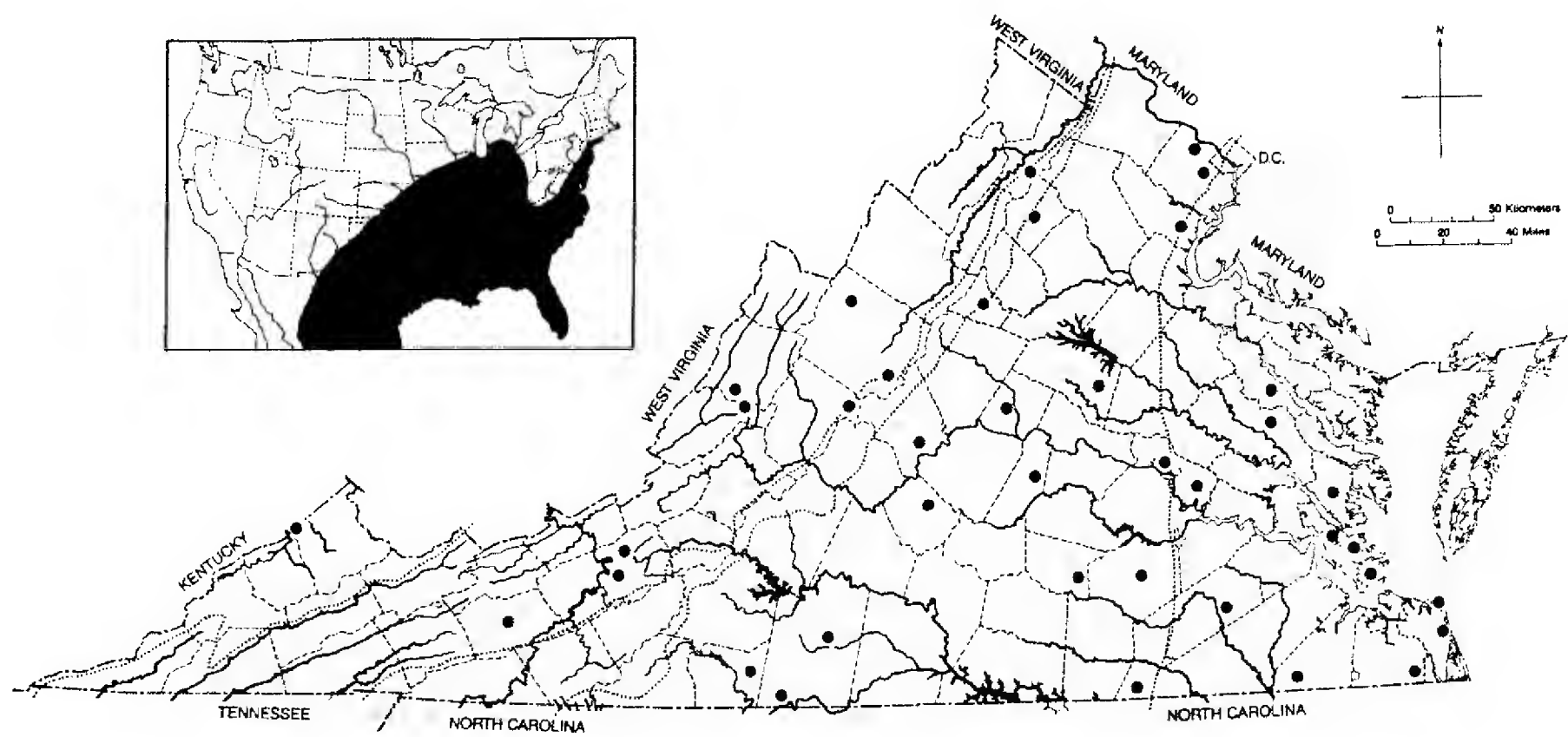
Map 21. *Pnirontis languida* Stål.



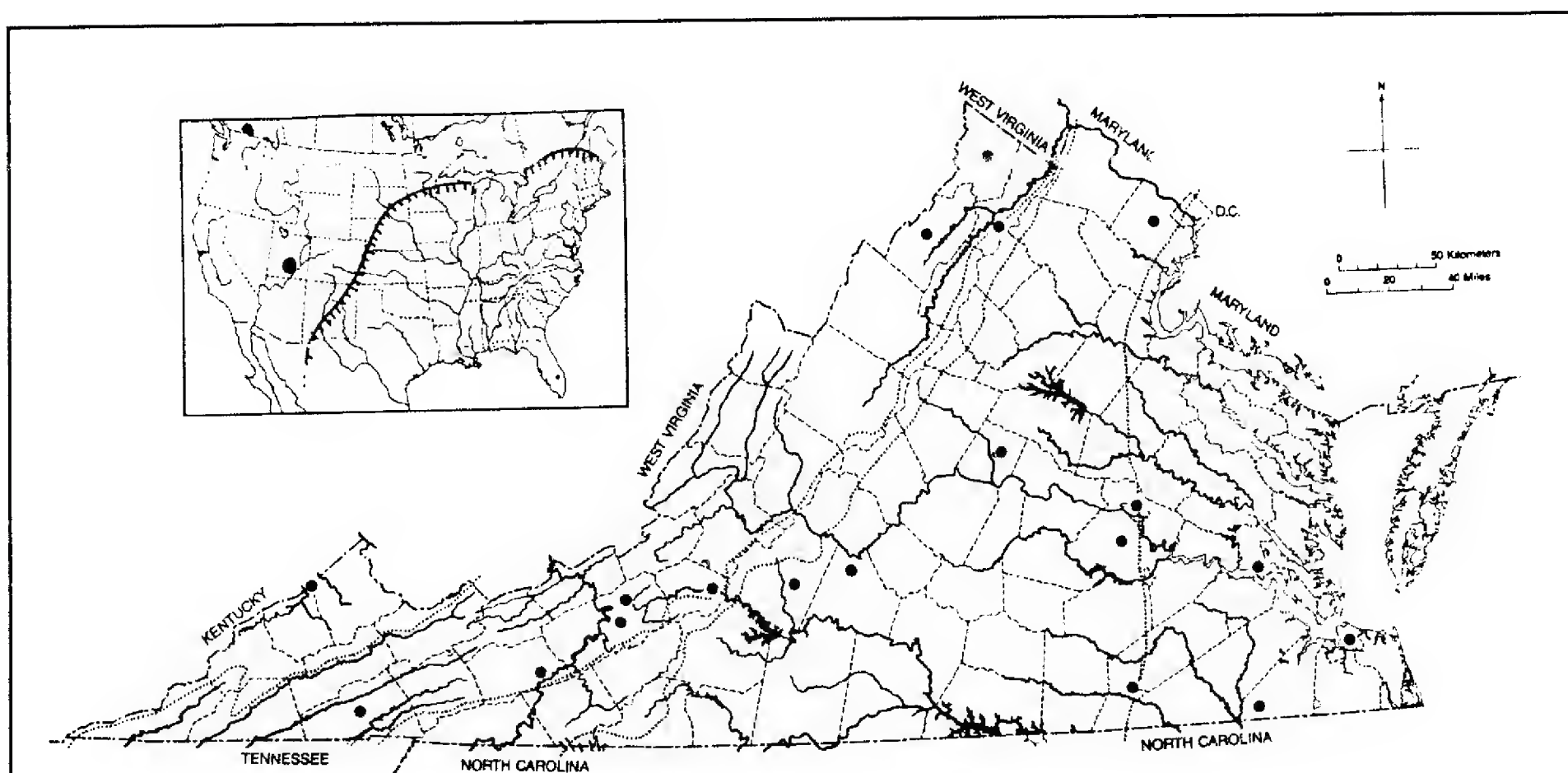
Map 22. *Pnirontis modesta* Banks.



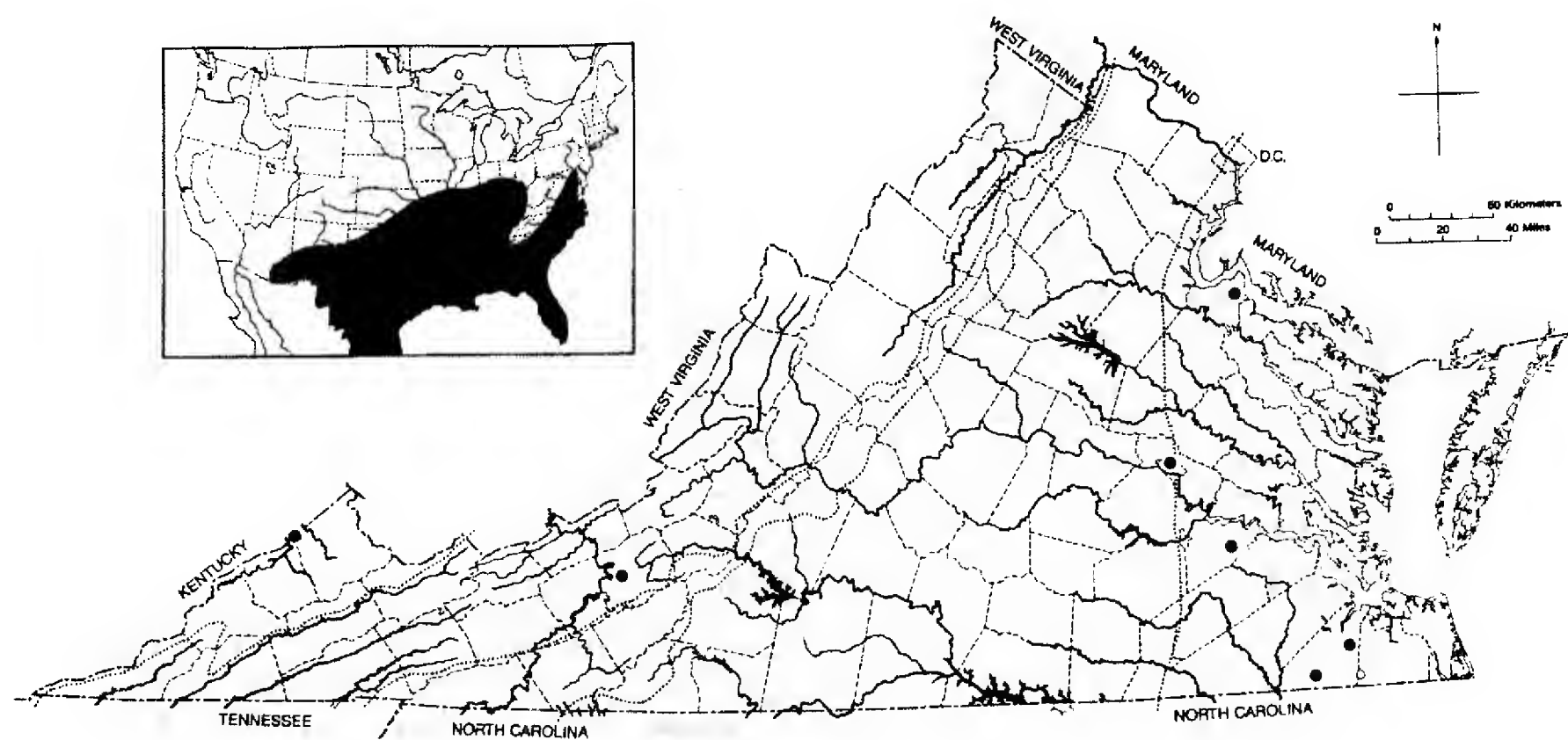
Map 23. *Pygolampis pectoralis* Stål.



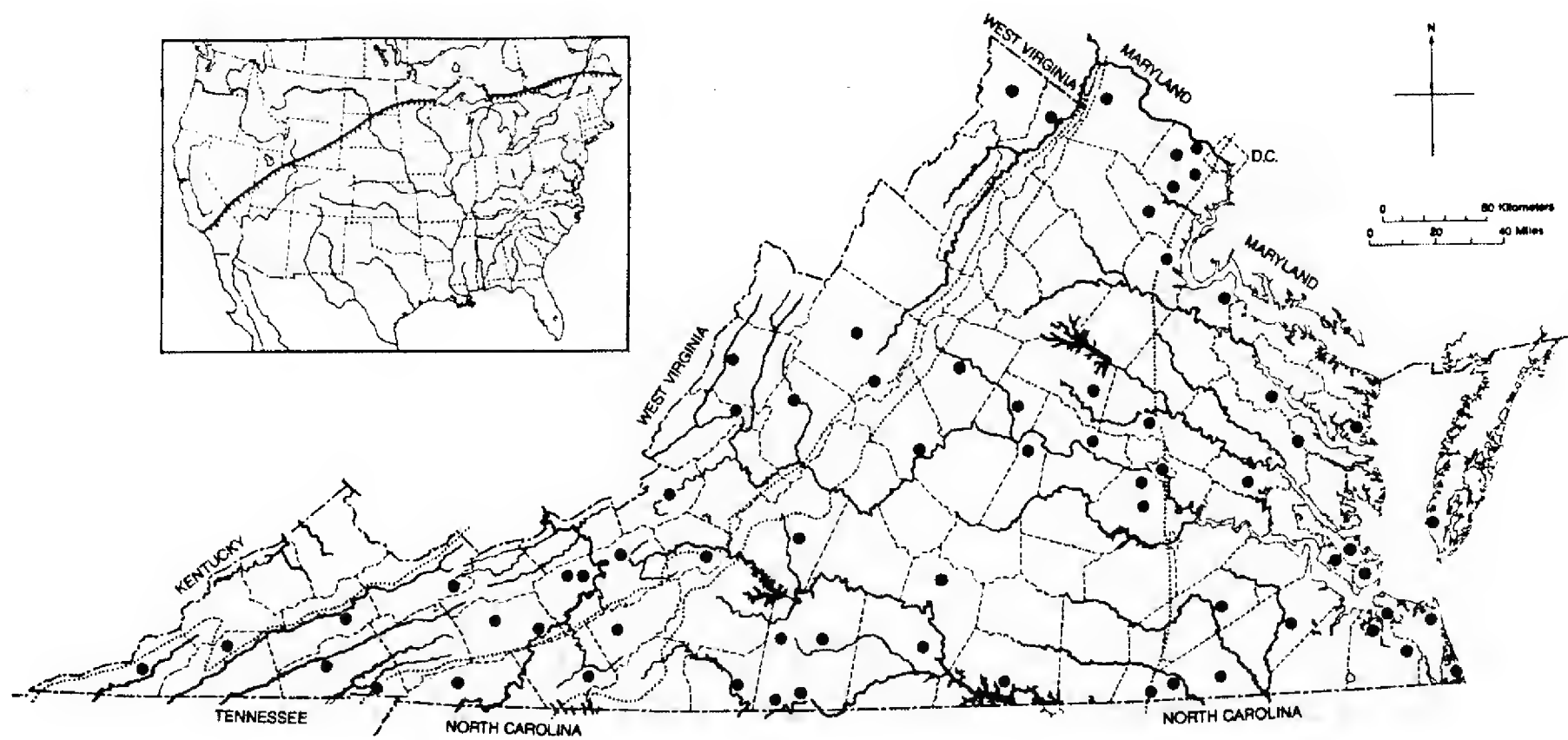
Map 24. *Stenopoda spinulosa* Giacchi.



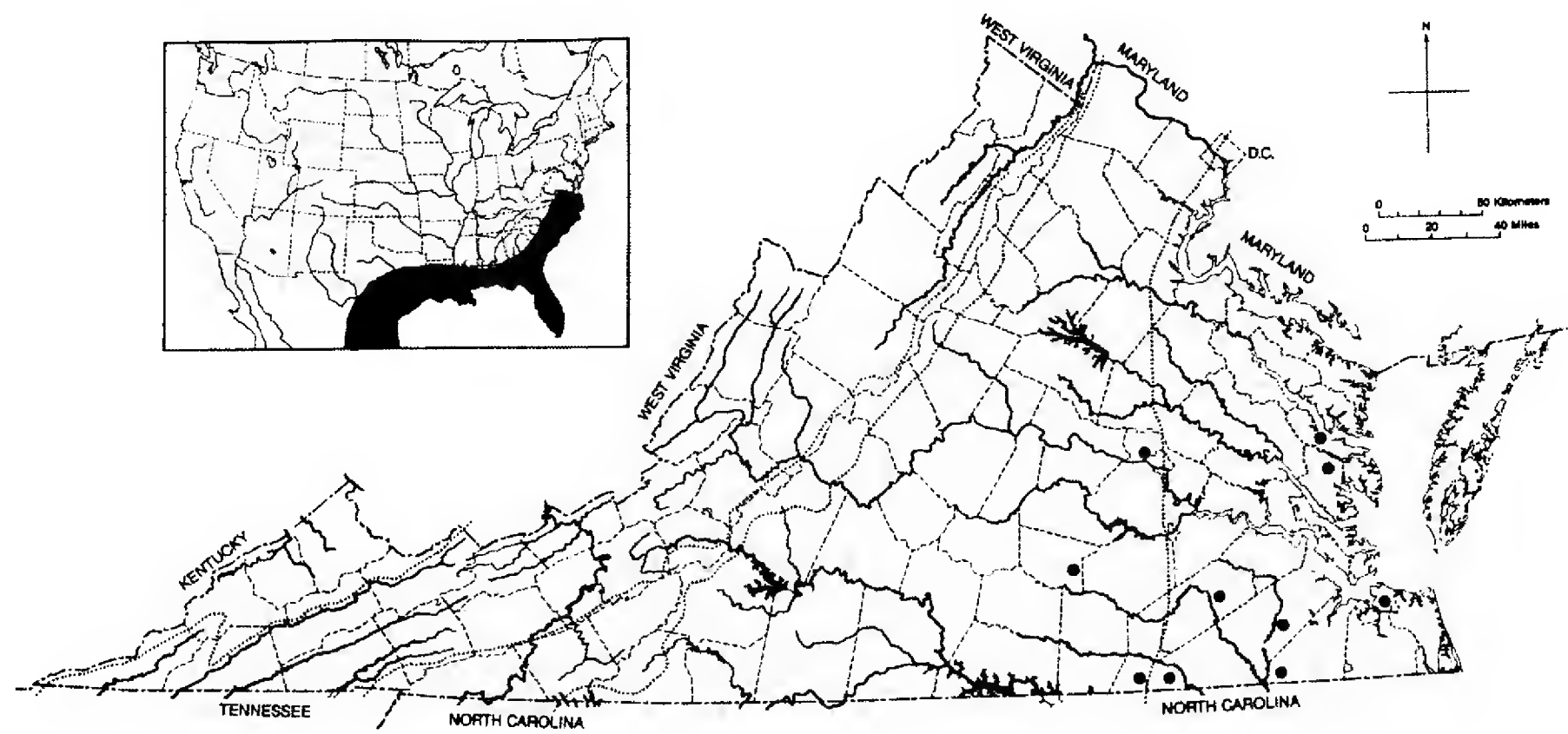
Map 25. *Reduvius personatus* (Linnaeus). Documented from the area south and east of the hatched line, also recorded for Utah and British Columbia, presumably disjunct.



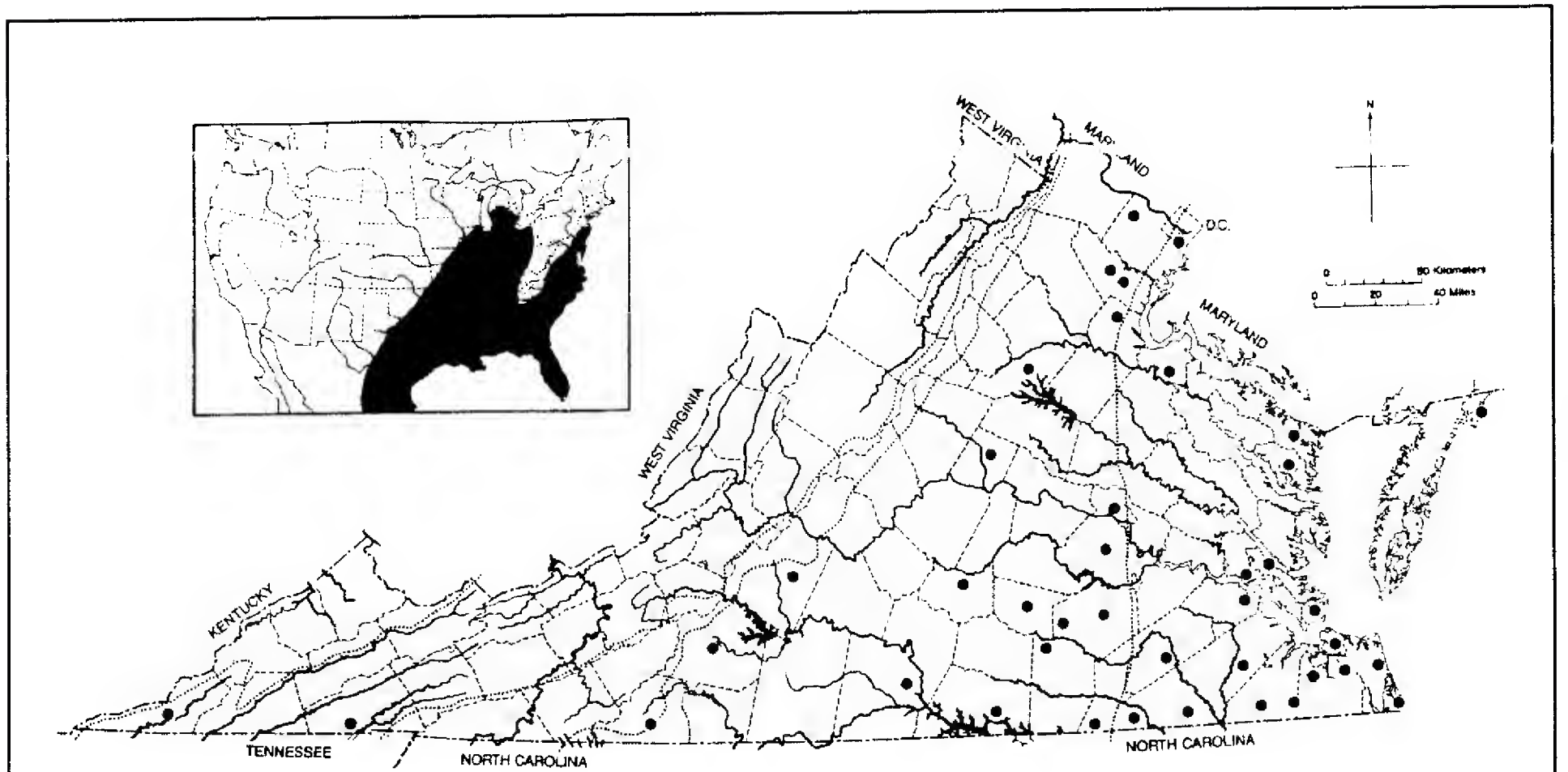
Map 26. *Triatoma sanguisuga* (LeConte). The absence of localities in the Piedmont is noteworthy.



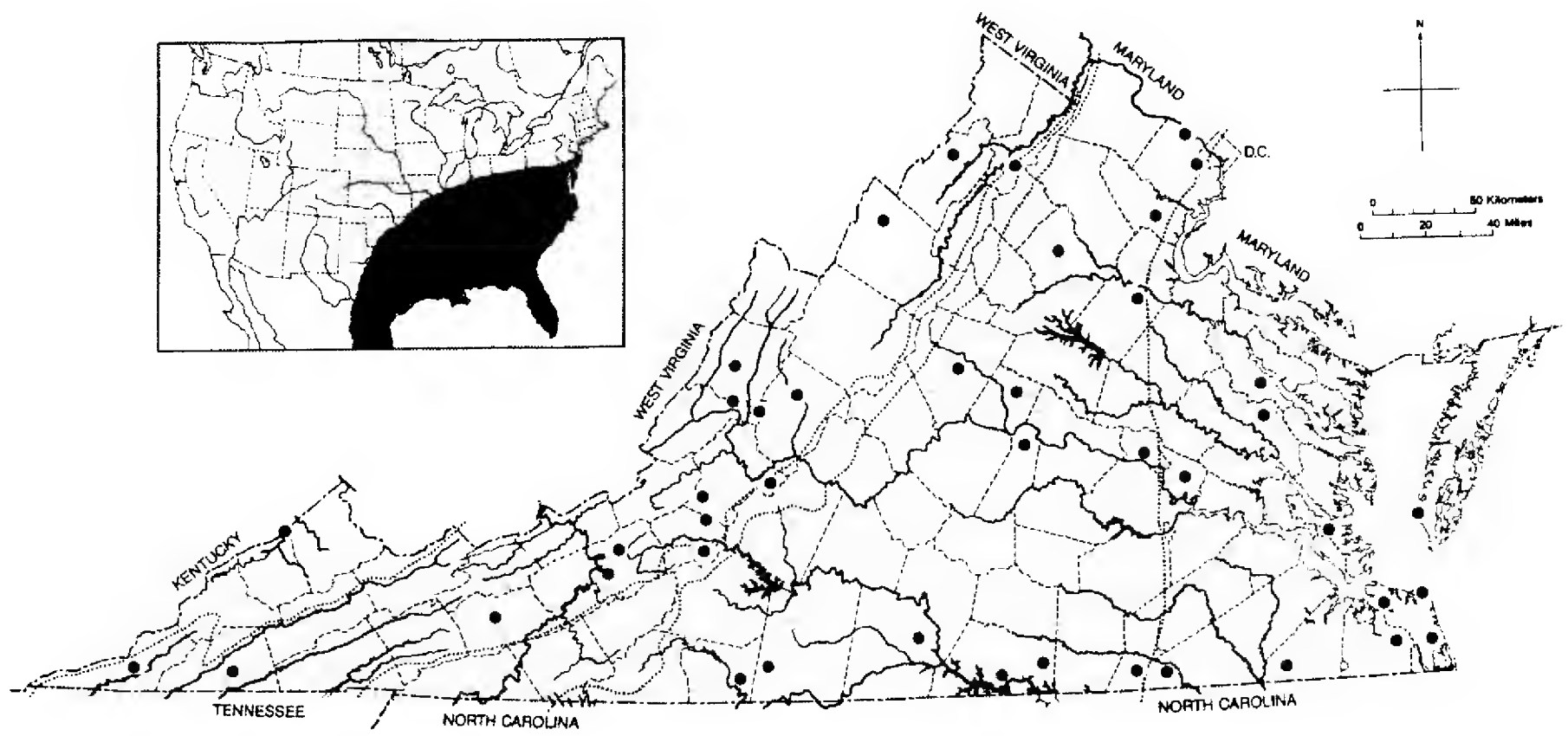
Map 27. *Melanolestes picipes* (Herrich-Schaeffer). The range is essentially continuous in the area east and south of the hatched line.



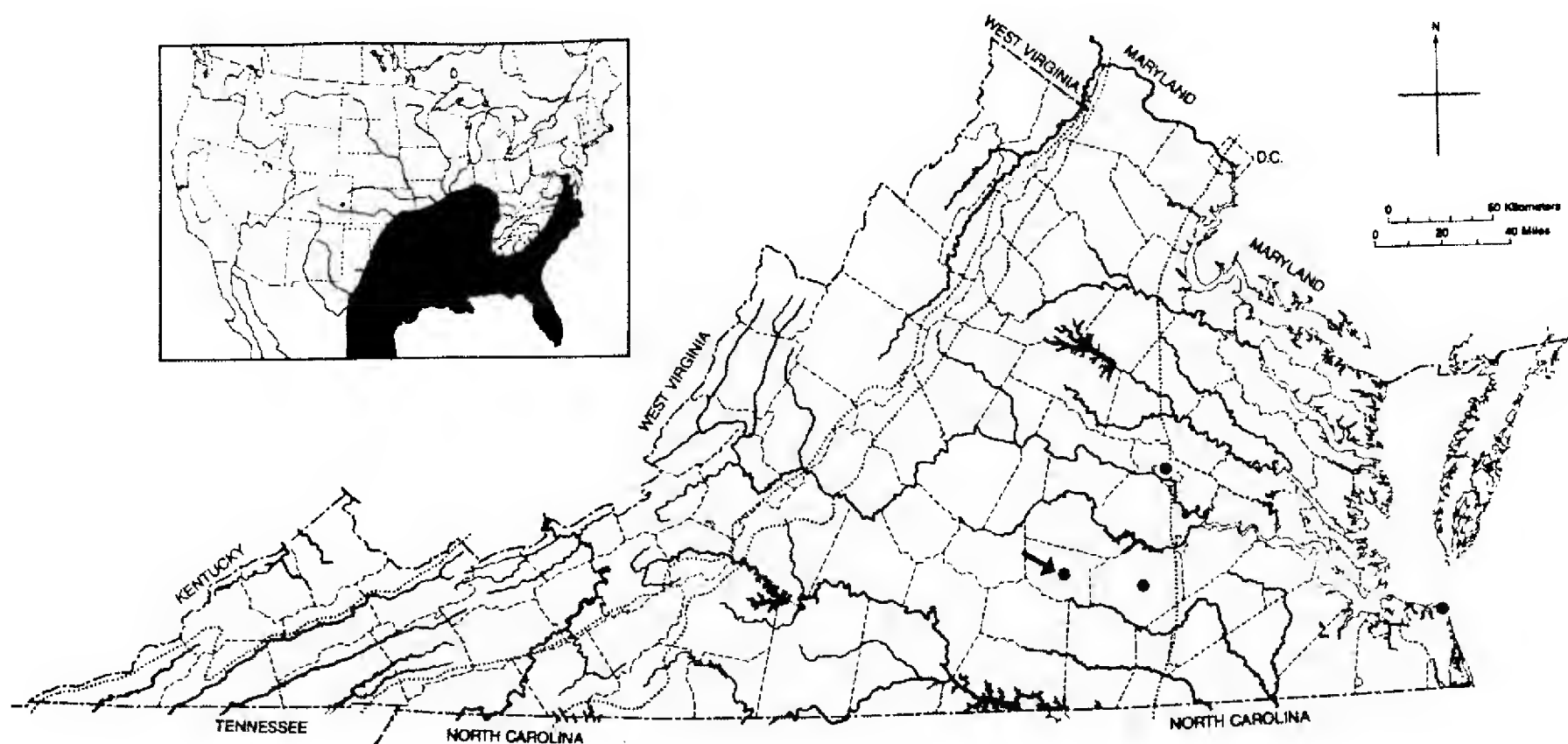
Map 28. *Rasahus hamatus* (Fabricius).



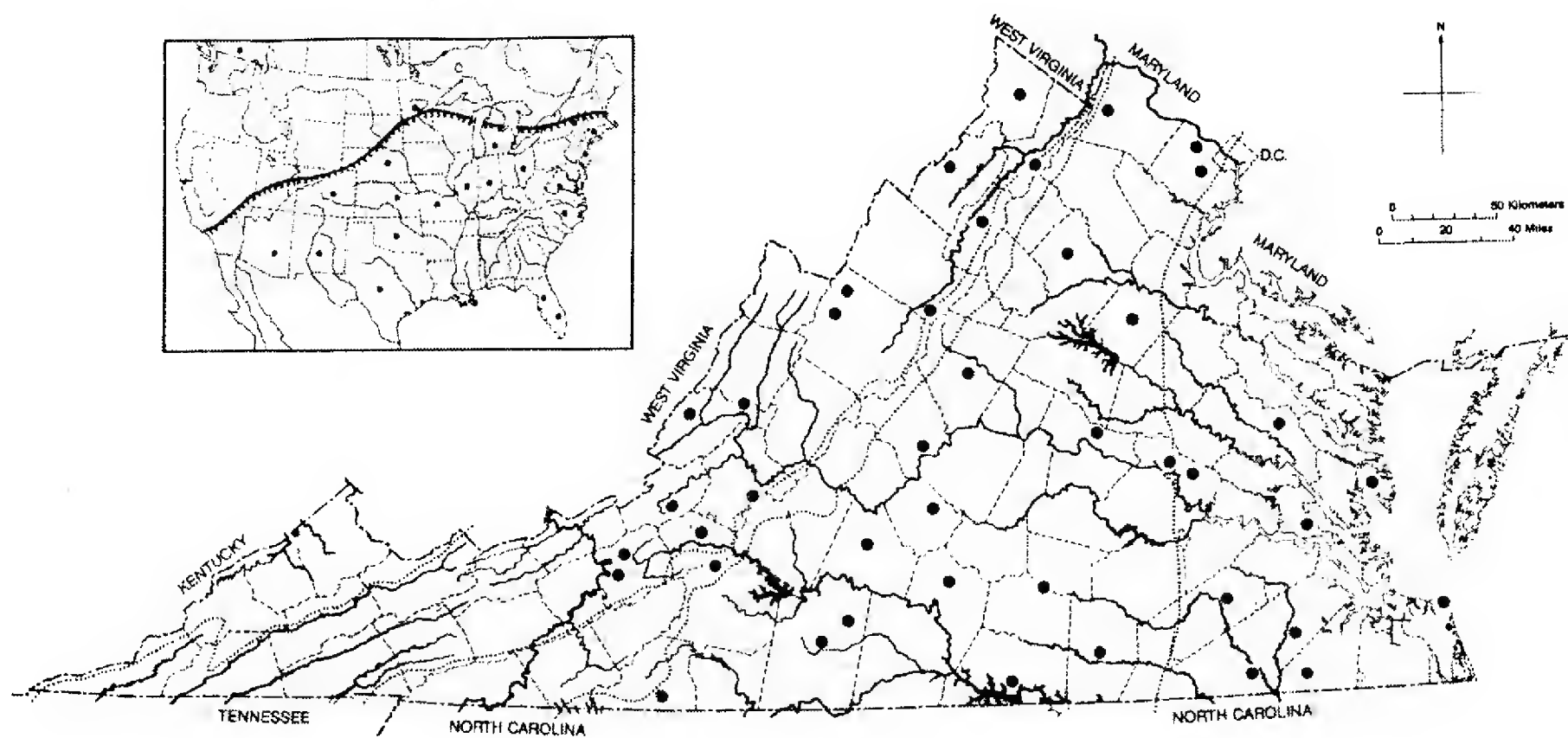
Map 29. *Sirthenia stria carinata* (Fabricius).



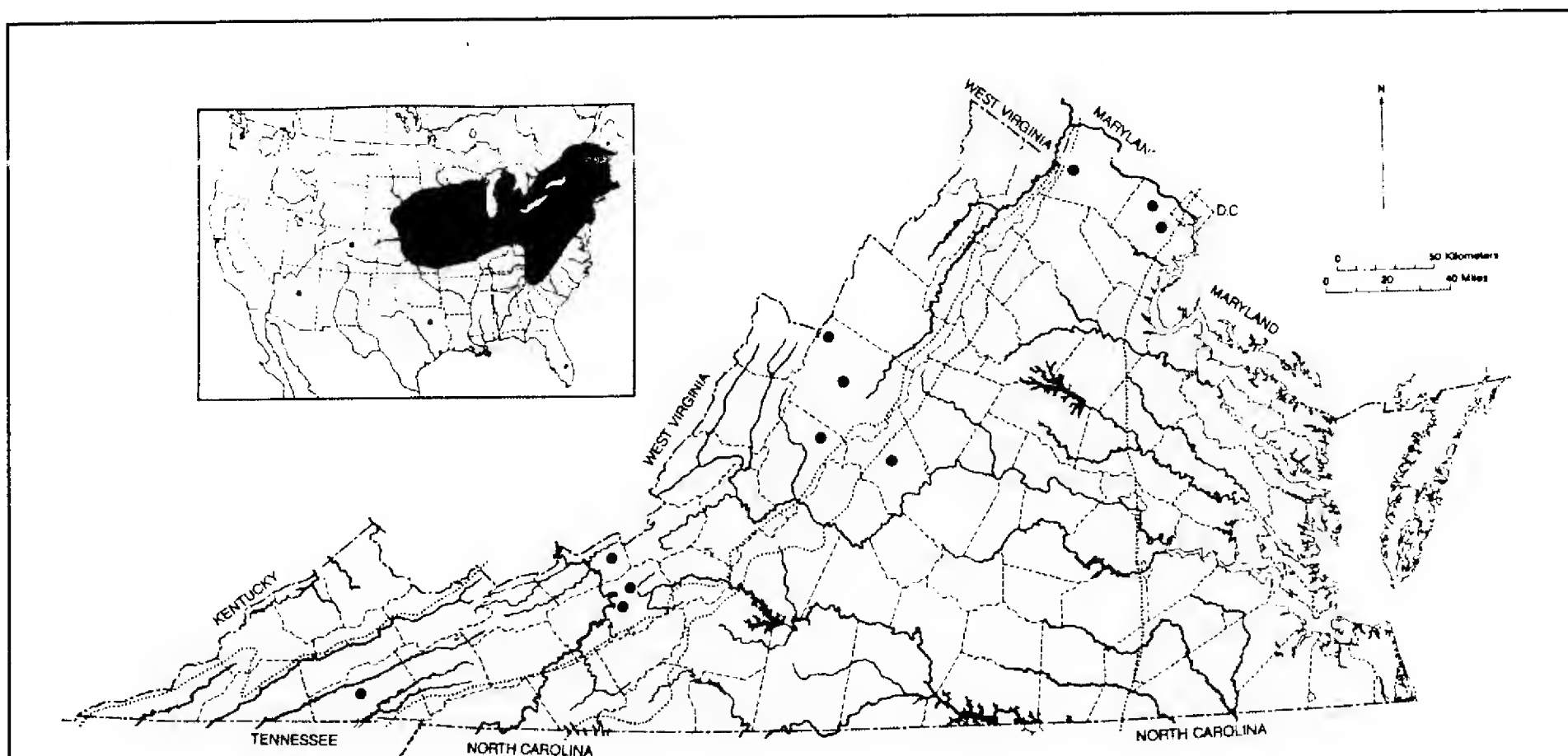
Map 30. *Rhiginia cruciata* (Say).



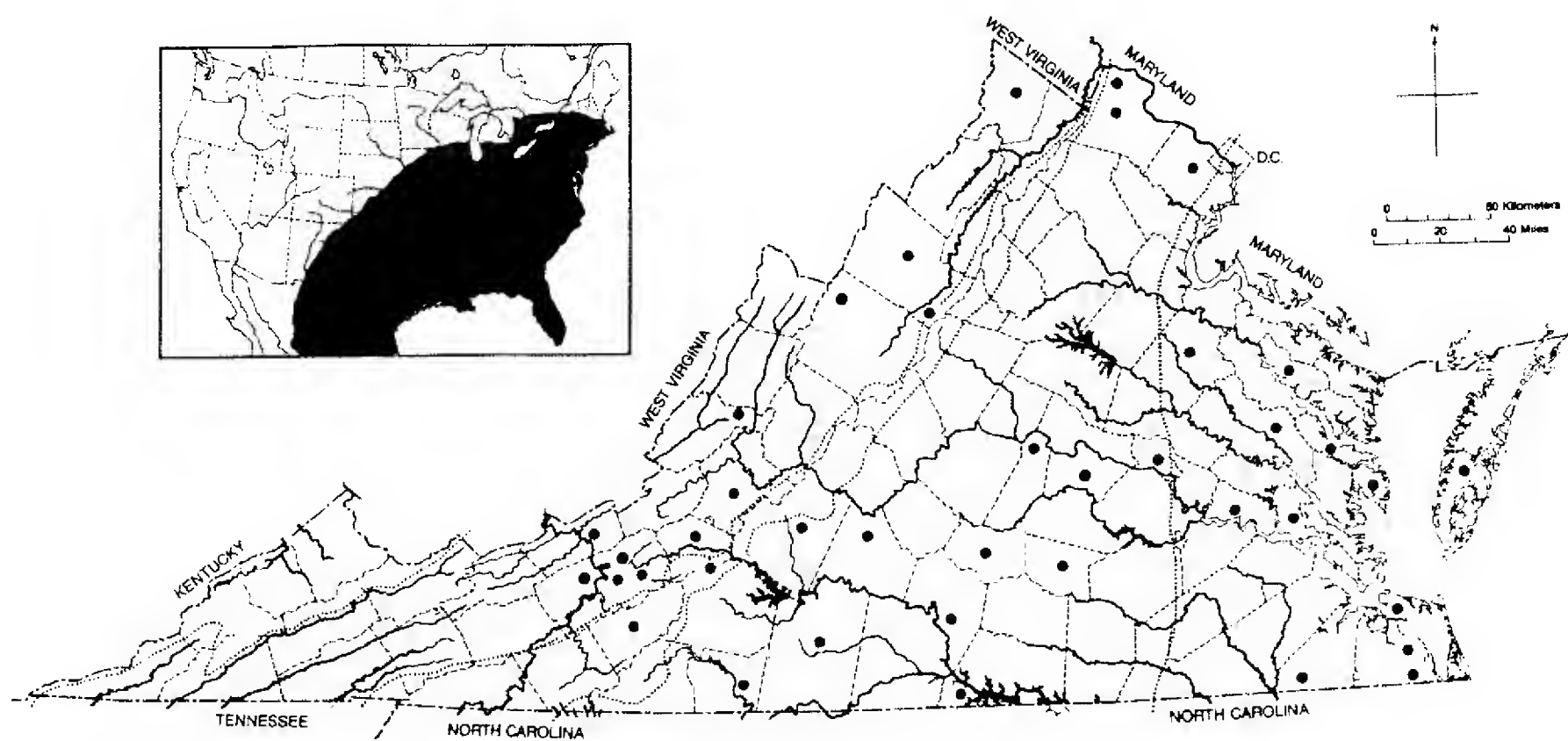
Map 31. *Microtomus purcis* (Drury). The assumed type locality is indicated by the arrow.



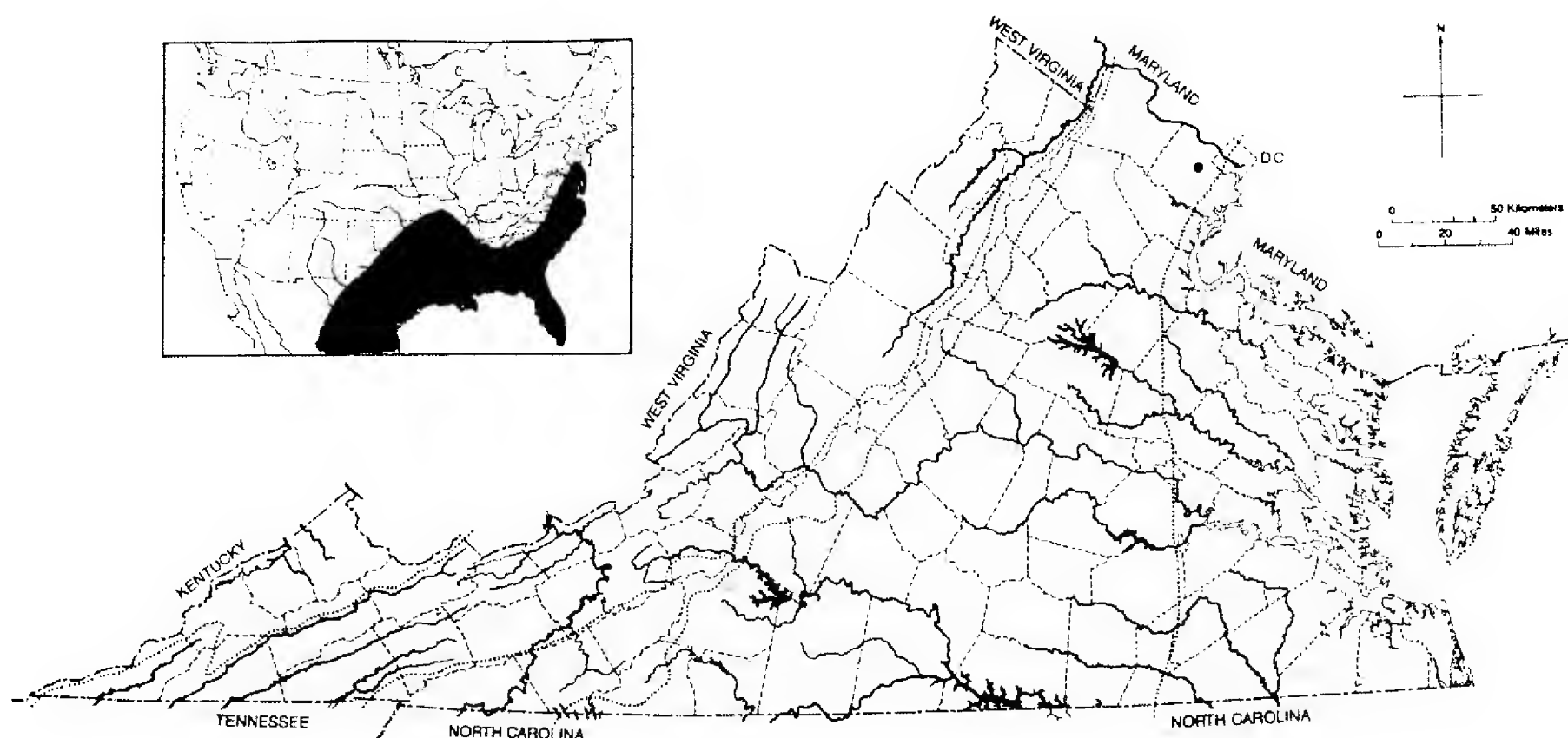
Map 32. *Apiomeris crassipes* (Fabr.). Generally distributed south and east of the hatched line; also recorded from British Columbia.



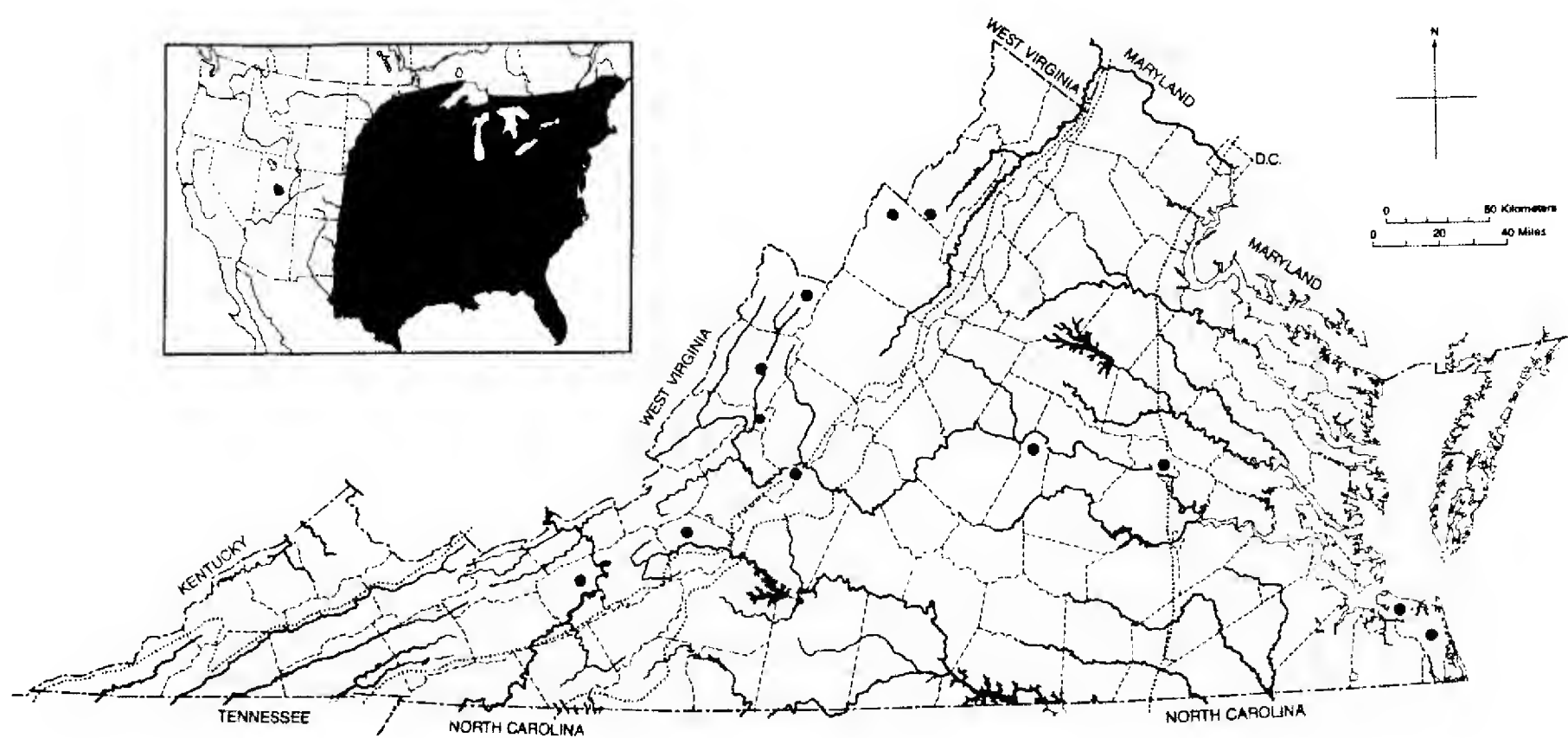
Map 33. *Acholla multispinosa* (DeGeer).



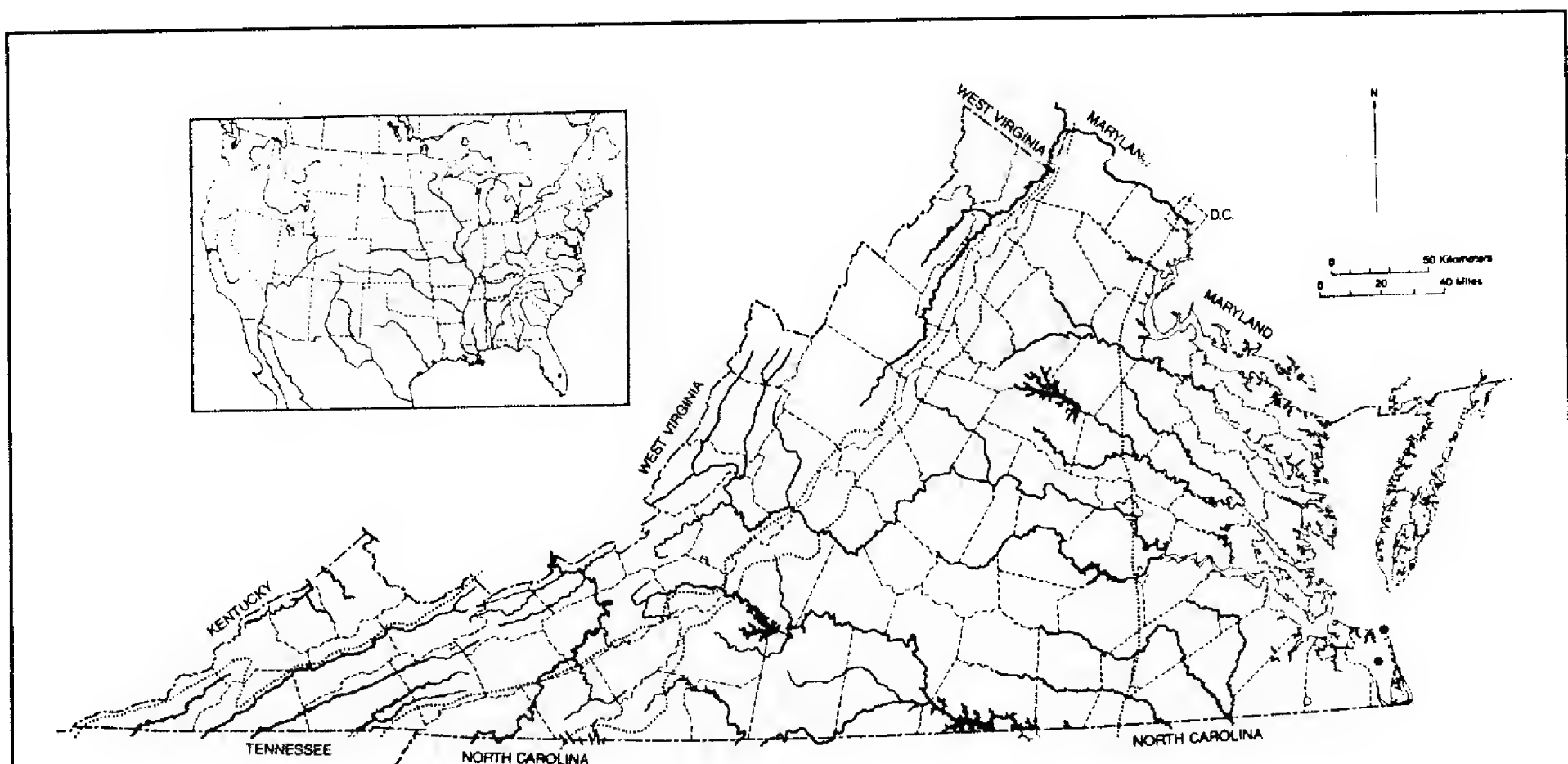
Map 34. *Arilus cristatus* (Linnaeus). The species is surely statewide at lower elevations; the absence of localities for southwestern Virginia can only reflect a collecting bias.



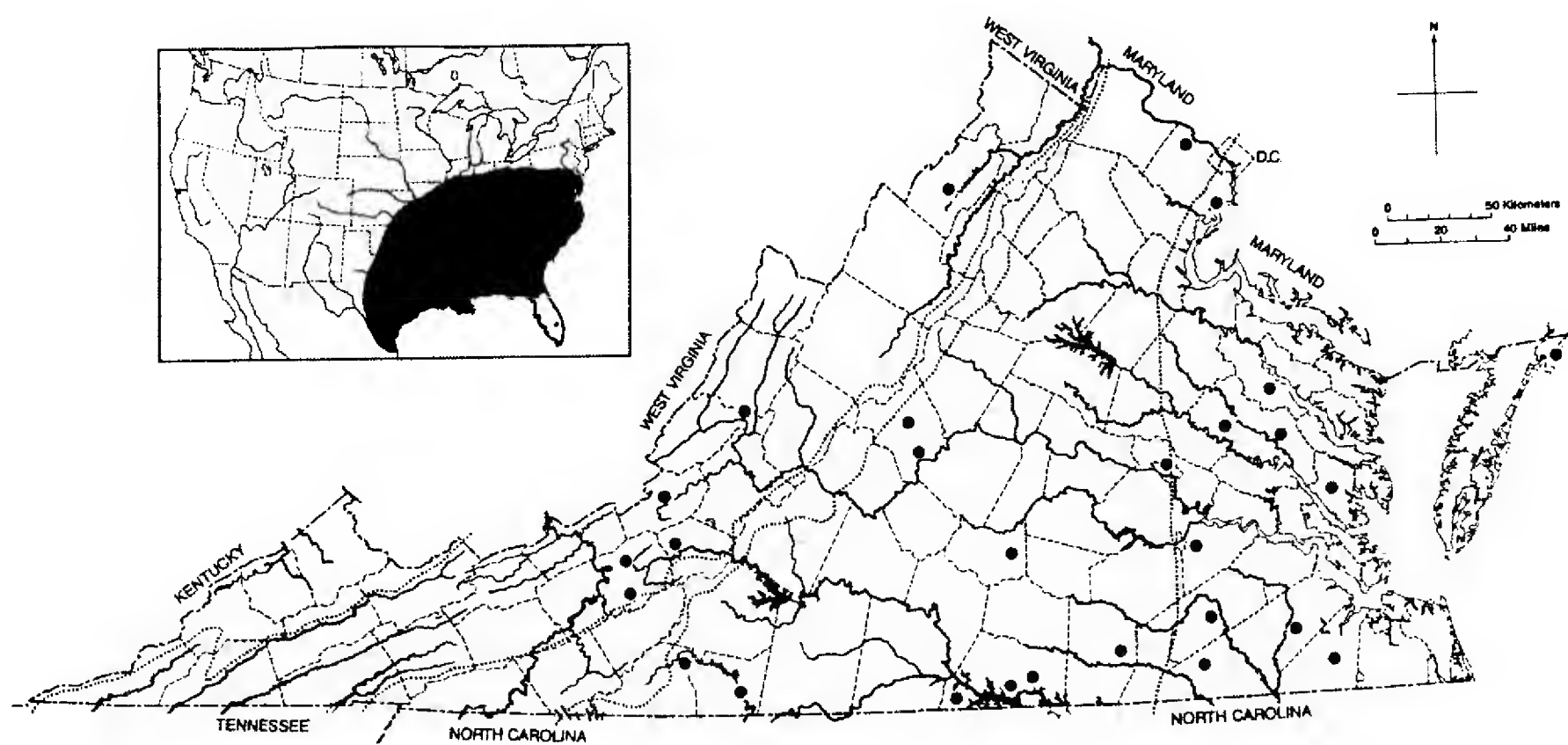
Map 35. *Atracheus cinereus* (Fabricius). The locality indicated for Fairfax County requires confirmation.



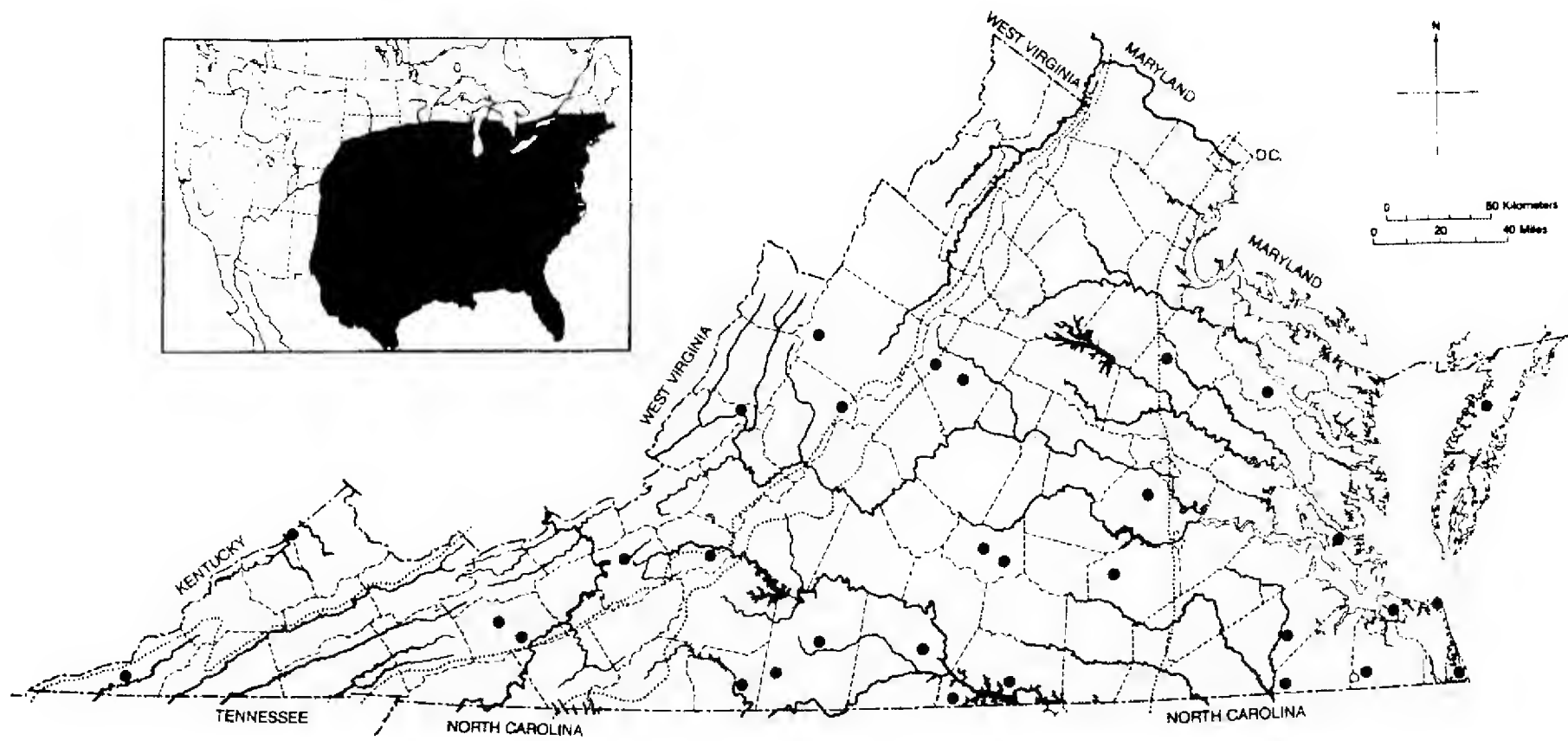
Map 36. *Fuchsia aptera* Stål.



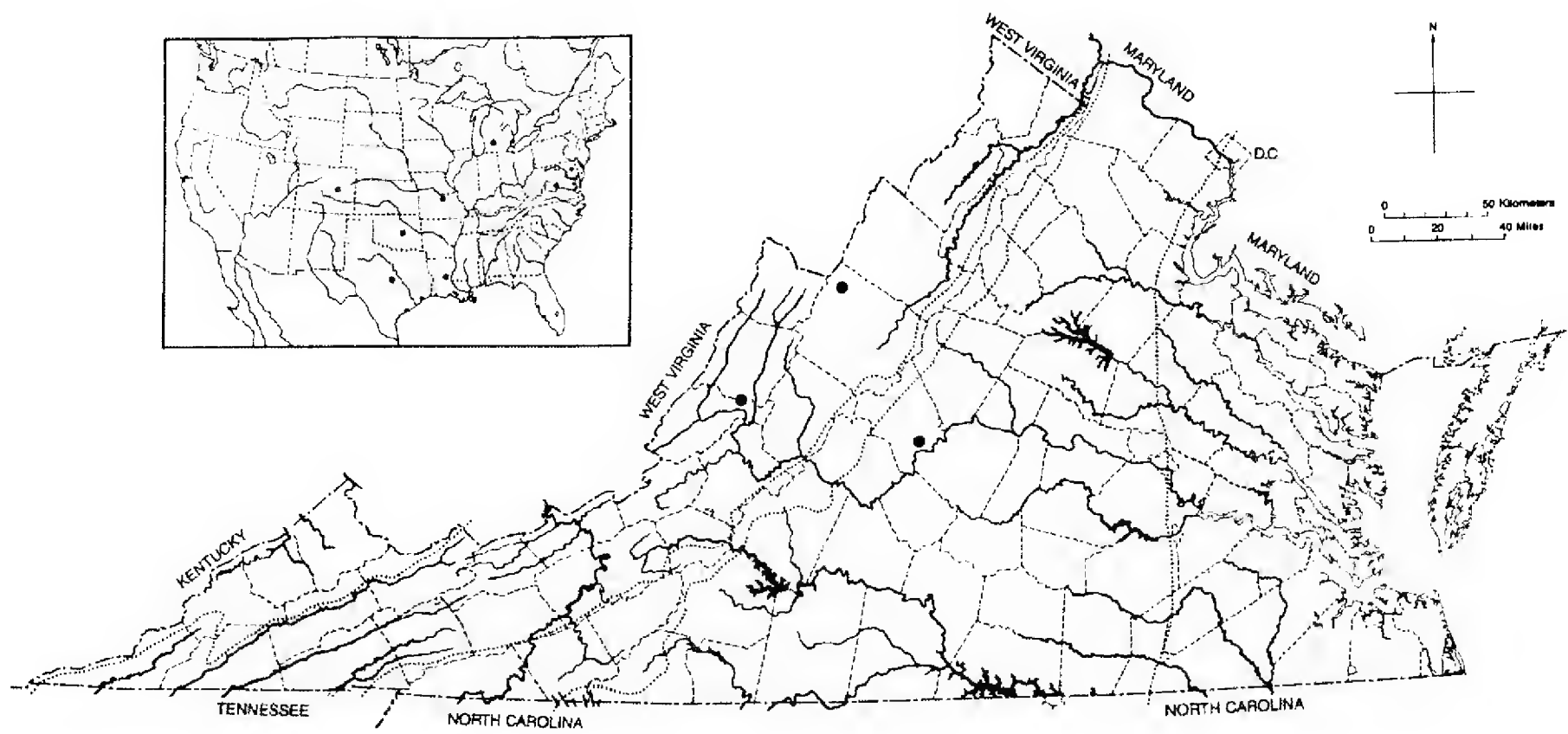
Map 37. *Fitchia spinosula* Stål. Inset map not shaded as this species apparently occurs in all states and the contiguous Canadian provinces.



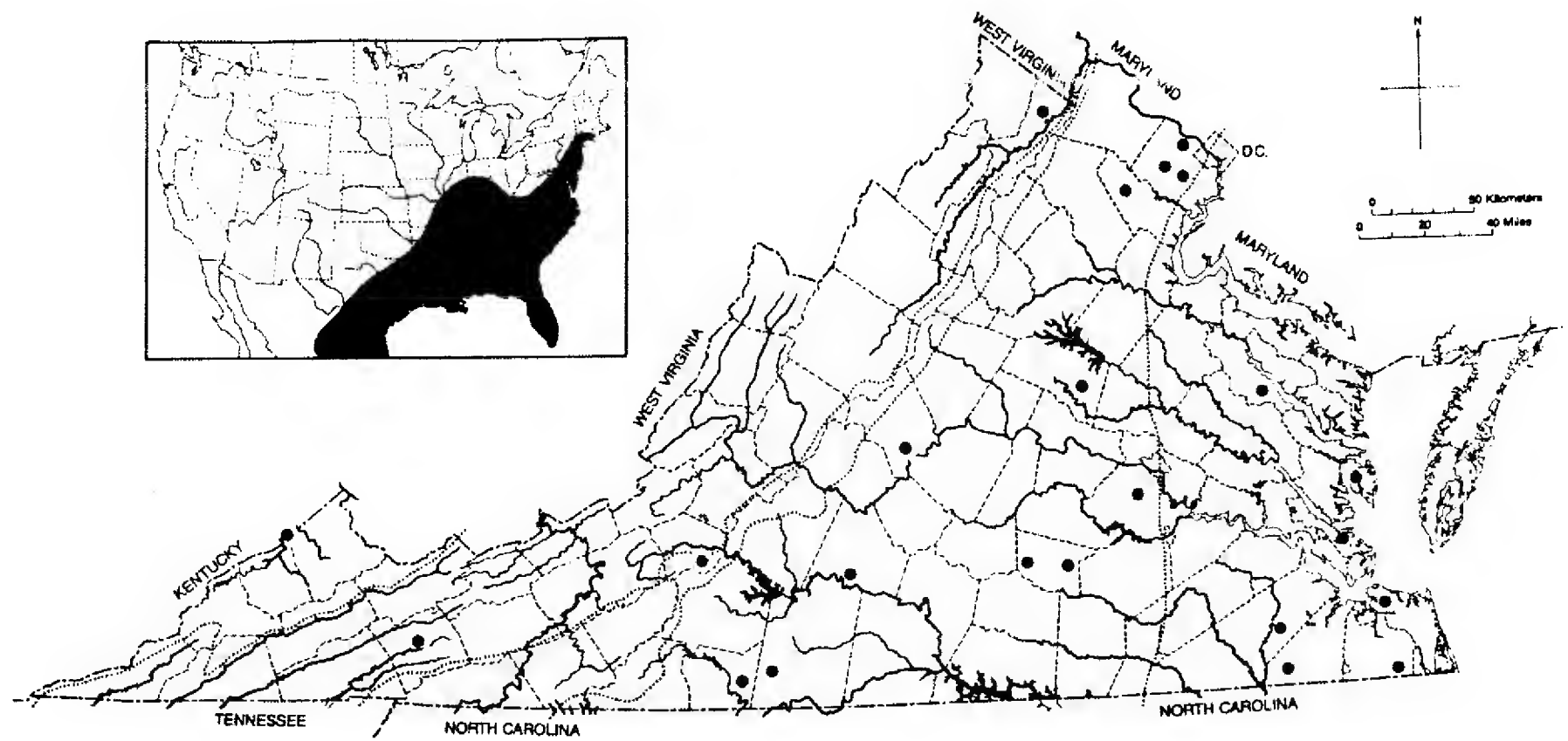
Map 38. *Pselliopus barberi* Davis.



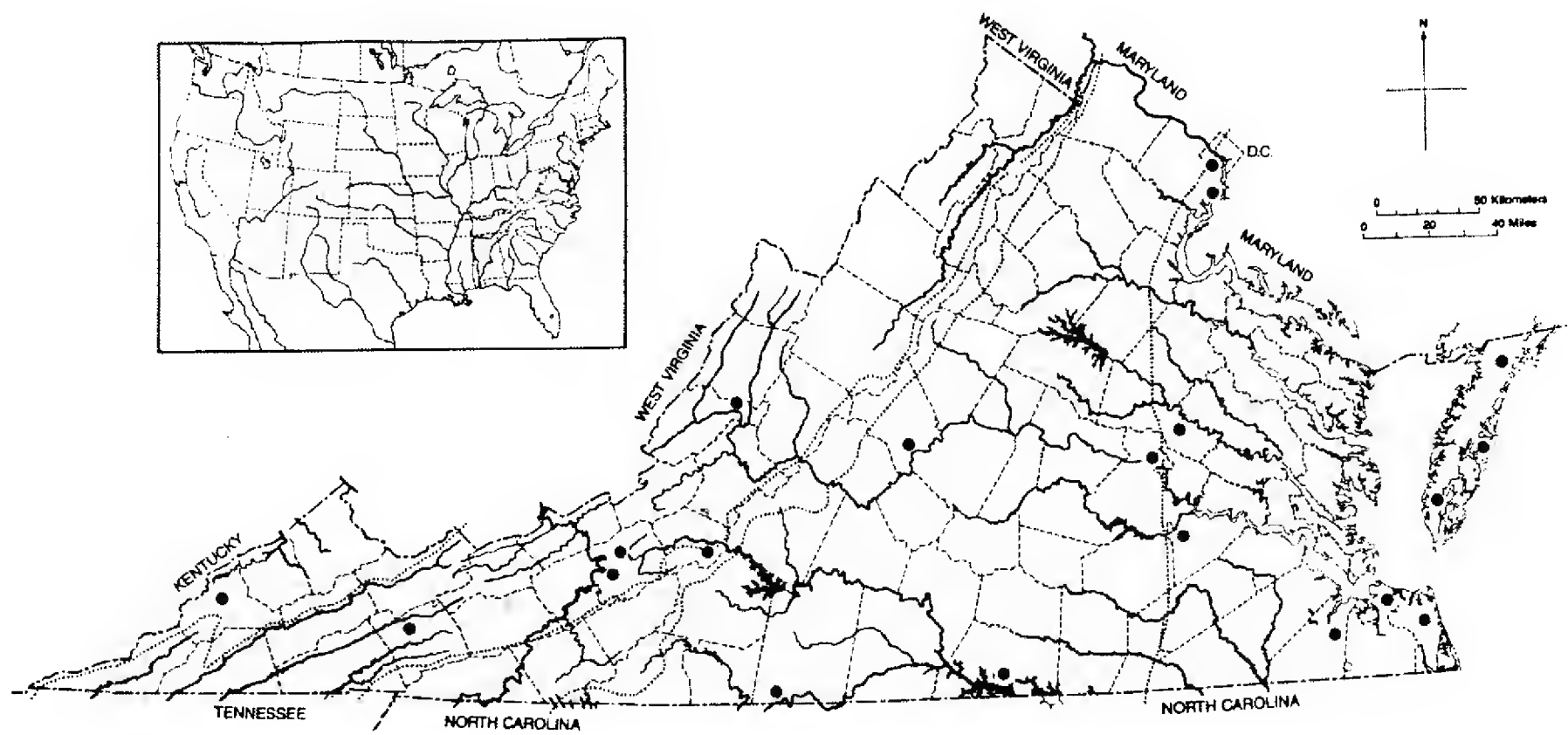
Map 39. *Pselliopus cinctus* (Fabricius).



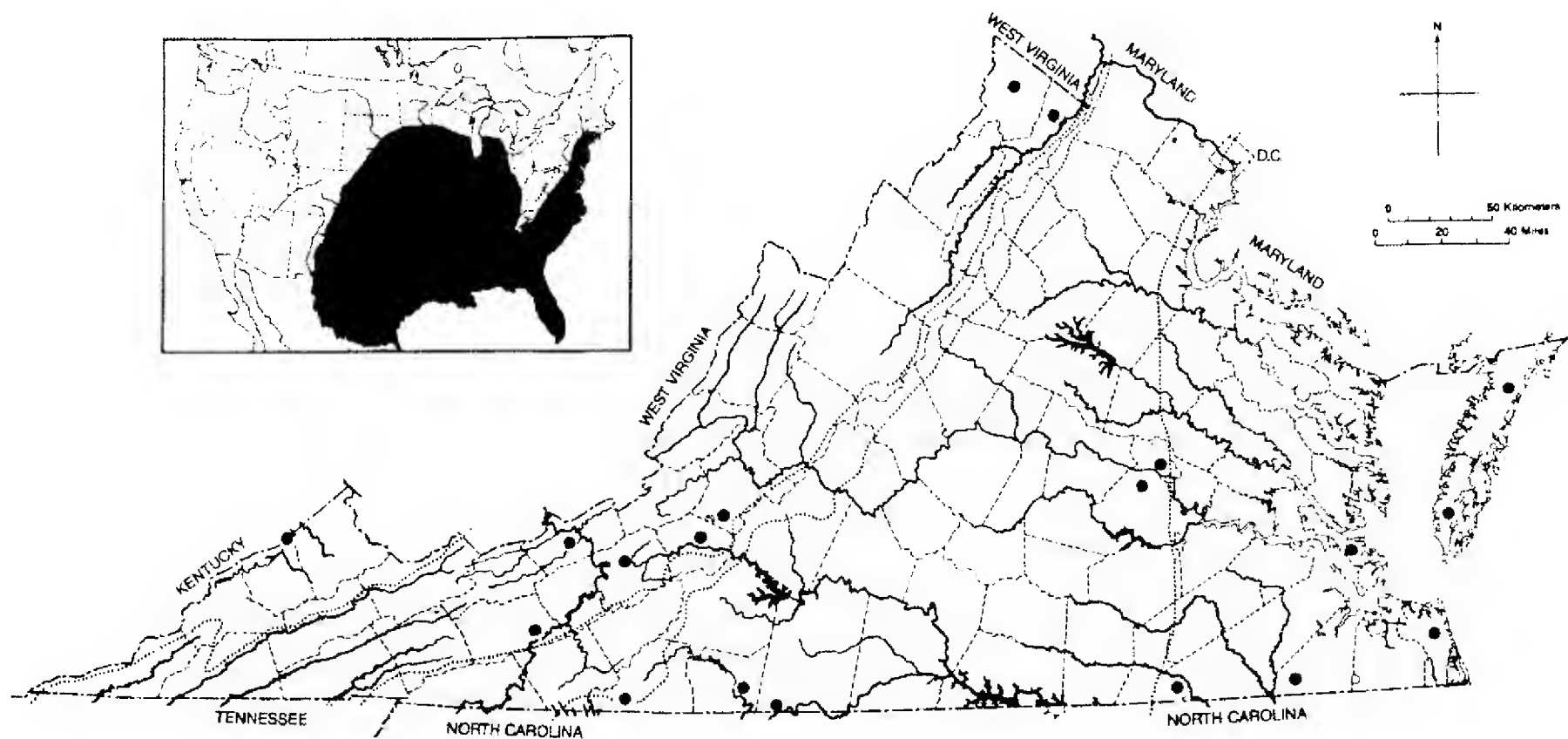
Map 40. *Pselliopus latifasciatus* Barber. So few localities are known for this species only the states of record are indicated on the inset map.



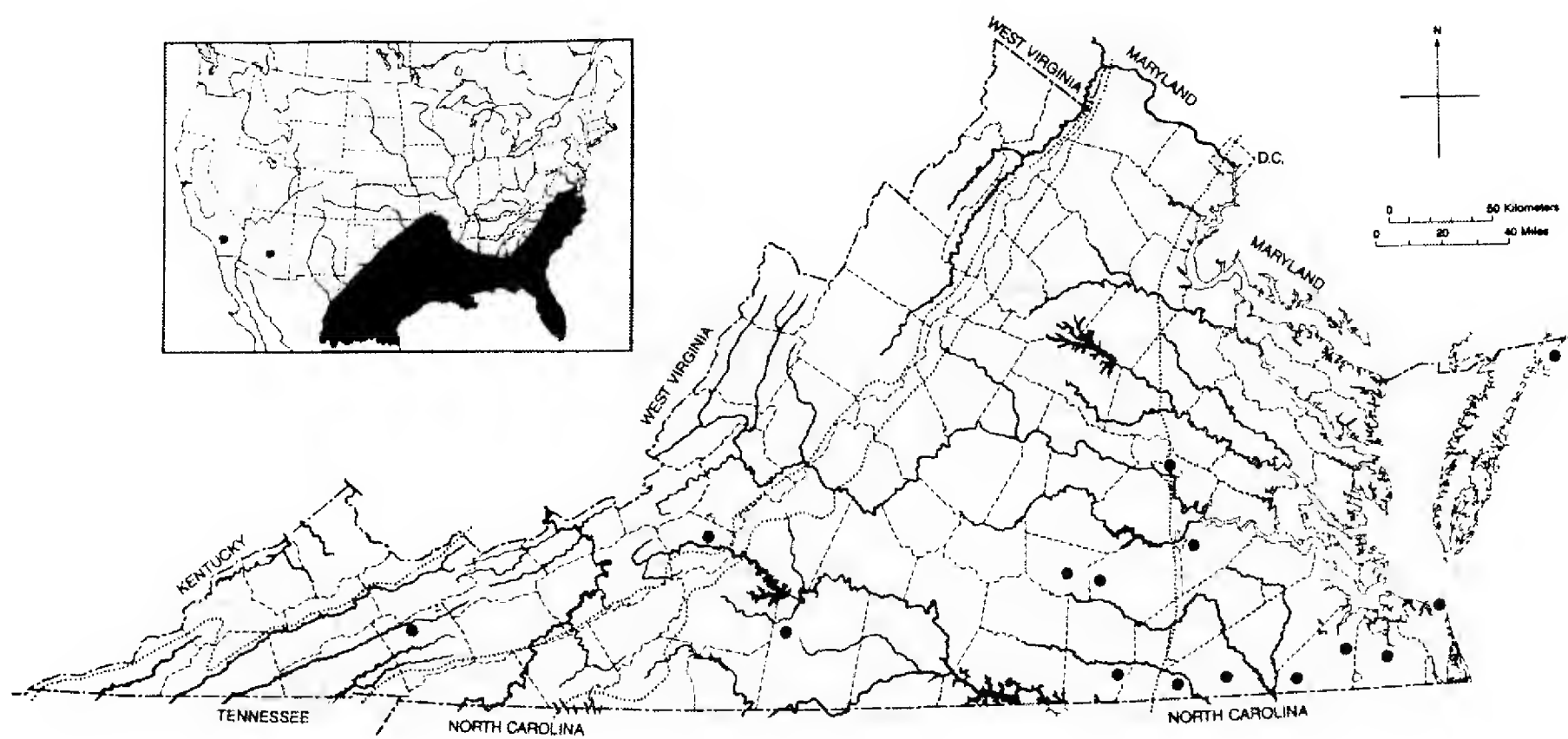
Map 41. *Rocconota annulicornis* (Stål).



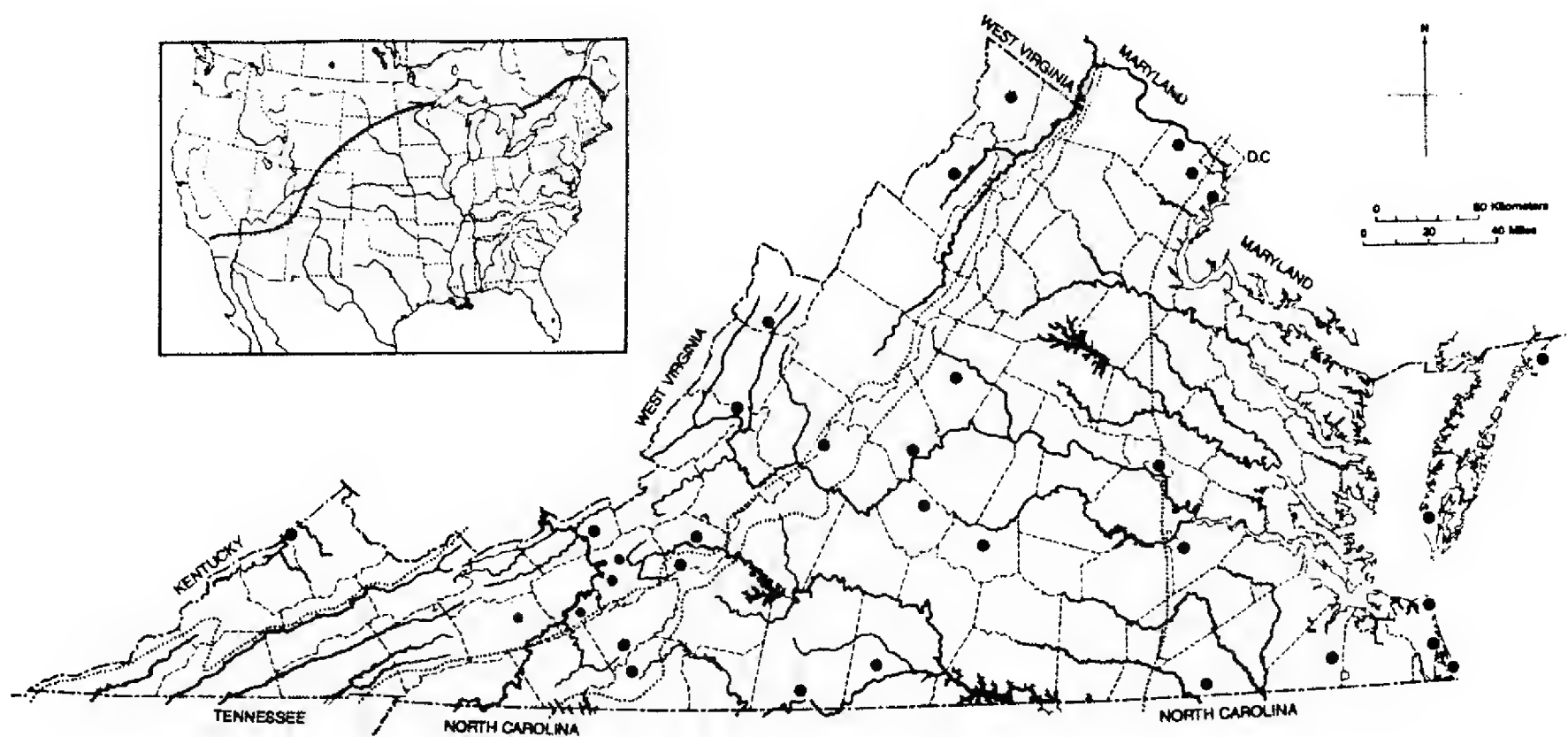
Map 42. *Sinea diadema* (Fabricius). The range includes all of the United States and southern Canadian provinces, the inset map is therefore not shaded.



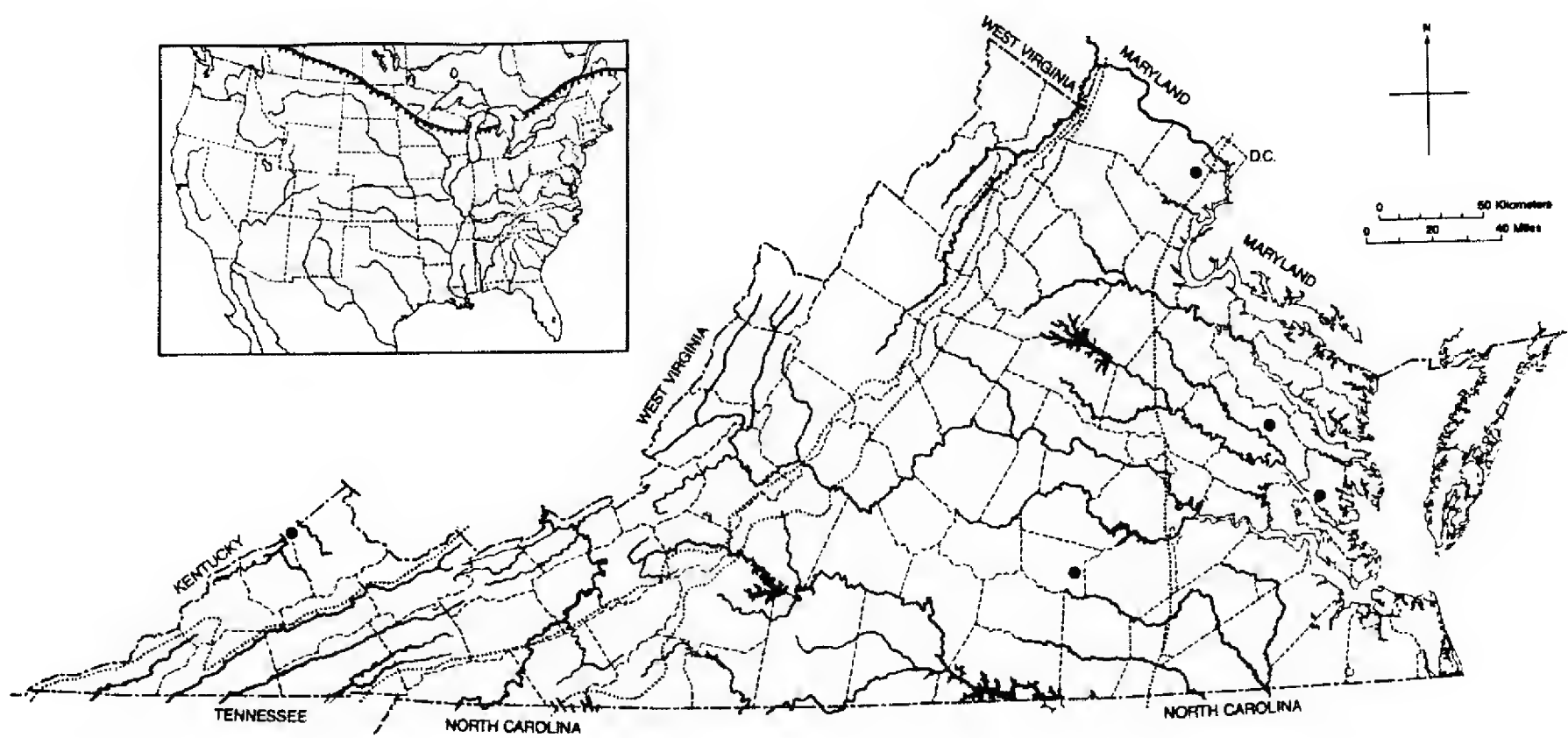
Map 43. *Sinea spinipes* (Say).



Map 44. *Zelus cervicalis* Stål. The range may be continuous across Arizona and California.



Map 45. *Zelus luridus* Stål. The species is generally distributed south and east of the hatched line; the locality in Manitoba may or may not be disjunct.



Map 46. *Zelus tetracanthus* Stål. Apparently present in all of the lower states and Canadian provinces; extent to the northwest is unknown.